

WETLAND BANKING INSTRUMENT

MORRIS SITE

Prepared by the

ILLINOIS DEPARTMENT OF TRANSPORTATION

January 2002

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I. Introduction

This instrument has been prepared in accordance with the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (Federal Register 1995). This instrument shall document agency concurrence on the objectives and administration of the Illinois Department of Transportation proposed bank in Grundy County near Morris, Illinois (Figure 1). This instrument describes in detail the physical and legal characteristics of the bank and how the bank will be established and operated.

The Illinois Department of Transportation proposes that all activities regulated under Section 404 or 10 will be eligible to use the Morris mitigation bank as compensation for unavoidable impacts to wetlands and/or aquatic resources. Credits from the bank may also be used to compensate for environmental impacts authorized under the Interagency Wetland Policy Act of 1989. In no case will the same credits be used to compensate for more than one activity; however, the same credits may be used to compensate for an activity which requires authorization under more than one program.

Under the existing requirements of Section 404 or 10, all appropriate and practicable steps will be undertaken by the Illinois Department of Transportation to first avoid and then minimize adverse impacts to aquatic resources, prior to authorization to use the Morris mitigation bank.

II. Bank goals and objectives

The goal of the bank is to take out of farming 475 acres of land on the floodplain of the Illinois River in Grundy County, Illinois and return it to something resembling a natural floodplain forest. The final product will be one contiguous tract of floodplain forest. The site will provide habitat for wildlife and recreational opportunities for people.

The objective is to reforest the farm ground with native species of trees and shrubs and allow for natural regeneration in the herbaceous layer. Site improvements for human use will be low-impact and will include paths for walk-in fishing and interpretive signing.

III. Ownership of bank lands

The Illinois Department of Transportation has acquired the land and holds fee-simple interest to the land. See Section XV for a discussion of the transfer and long-term management and maintenance of the bank site.

IV. Bank size and classes of wetlands and other aquatic resources proposed for inclusion in the bank, including site plan and specifications

The proposed bank site is approximately 831 acres.

Table 1.

Classes of wetlands and other aquatic resources to be included in the Morris bank site.

Class	Existing habitat	Proposed habitat	Ratio	Area (acres)	Credits (acres)
Wetland preservation	wet floodplain forest	wet floodplain forest	0.1:1.0	93.9	9.4
	wet floodplain forest		0.0:1.0	66.7	0.0
	marsh	marsh		1.3	
	pond	pond		8.3	
Wetland enhancement	farmed wetland	wet floodplain forest	0.25:1.0	4.3	1.1
	wet shrubland		0.2:1.0	5.2	1.0
	wet meadow / woodland complex			60.0	12.0
Wetland restoration	agricultural land	wet floodplain forest	1.0 : 1.0	109	109
Non-wetland preservation	floodplain forest	floodplain forest	10% of total wetland credits generated	44.1	13.3
	Mazon River, Mud Slough	Mazon River, Mud Slough		44.5	
Non-wetland restoration	agricultural land	floodplain forest		393.7	
			Total	831.0	145.8

The general site plan is presented on Figure 2.

Specifications

Wetland preservation

Approximately 94 acres of forested wetlands will be preserved and will generate 9.4 acres of credits. This area consists of wetland sites one and twenty-six (see Appendix 1). The two wetland sites were deemed suitable for preservation because of

their high floristic quality, meeting or exceeding index values of 20 (see Appendix 1 for an explanation of the floristic quality index).

Approximately 76 acres of existing wetlands will be preserved but will generate no credits because the floristic quality of these areas is low (values of 17.0 to 10.0).

Areas slated for preservation are considered to be mostly self-maintaining and will receive little to no management in the immediate future. Besides wildlife habitat and stream bank stabilization functions, the existing wetlands are a source of propagules for the colonization of wetland restoration and enhancement areas. At some point, the existing wetlands may benefit from a timber stand improvement, such as a thinning or release cutting.

Wetland enhancement and restoration

Approximately 69 acres of wetlands will be enhanced and will generate 14.2 acres of credits. Enhancement areas include a farmed wetland (site 7), a pasture (site 14) and a willow thicket (site 24). The floristic quality of these sites is low, ranging from 6.0 to 11.0. These sites are described in Appendix 1. The Illinois Department of Transportation will enhance these wetlands by clearing invasive vegetation and planting them with conservative, hydrophytic plants (Table 2). Tree and shrub strata will be restored.

Approximately 109 acres of old agricultural fields on poorly drained Sawmill soils will be restored to wetlands, and an equal amount of credits will be generated. The Illinois Department of Transportation will restore wetlands by clearing invasive vegetation and replanting with conservative, hydrophytic species (Table 2). In some fields wetland hydrology will be restored first, followed by planting.

Table 2.

Below is a list of candidate trees and shrubs for planting in wetland enhancement and restoration areas at the bank site. All species are hydrophytic.

T R E E S

paw paw	(<i>Asimina triloba</i>)	FAC
bitternut hickory	(<i>Carya cordiformis</i>)	FAC
green ash	(<i>Fraxinus pennsylvanica</i>)	FACW
sycamore	(<i>Platanus occidentalis</i>)	FACW
swamp white oak	(<i>Quercus bicolor</i>)	FACW+
pin oak	(<i>Quercus palustris</i>)	FACW

S H R U B S

indigo bush	(<i>Amorpha fruticosa</i>)	FACW+
pale dogwood	(<i>Cornus obliqua</i>)	FACW+
gray dogwood	(<i>Cornus recemosa</i>)	FACW-
red osier dogwood	(<i>Cornus stolonifera</i>)	FACW

Bare root seedlings or three-gallon containerized plants will be used in enhancement or restoration areas. Containerized plants will be preferred because they should be taller

than bare root plants and compete better with other vegetation, and the plant tips should be out of reach from deer.

If bare root seedlings are planted, the rate and spacing will be 430 trees and shrubs per acre on approximately 10 by 10 foot centers. If containerized plants are used 70 trees and shrubs per acre will be planted on 25 foot centers. On enhancement areas with scattered trees, lower numbers of trees and shrubs will be planted; that is, 35 containerized, or 200 bare root, plants per acre.

The herbaceous layer of wetland enhancements and restorations is currently vegetated and will not be planted. Over time, species composition should change and improve. Propagules from on-site wetlands will be carried in by wind or floodwater and will colonize the planned ones. On-site wetlands include the following hydrophytic plants in the herbaceous layer (see also Appendices 1 and 2): paniced aster (*Aster simplex*), bur sedge (*Carex grayi*), tussock sedge (*Carex stricta*), stout wood reed (*Cinna arundinacea*), Virginia wild rye (*Elymus virginicus*), Virginia waterleaf (*Hydrophyllum virginianum*), pale touch-me-not (*Impatiens pallida*), Canada wood nettle (*Laportea canadensis*), white grass (*Leersia virginica*), rice cutgrass (*Leersia oryzoides*), moonseed (*Menispermum canadense*), Canada clearweed (*Pilea pumila*), cursed crowfoot (*Ranunculus sceleratus*), swamp buttercup (*Ranunculus septentrionalis*), cutleaf coneflower (*Redbeckia laciniata*), swamp dock (*Rumex verticillatus*), slenderleaf betony (*Stachys tenuifolia*), stinging nettle (*Urtica dioica*).

Non-wetland Habitats

Non-wetlands provide functions of equal importance as wetlands, and the two habitats are inextricably linked. For example, the life history of most amphibians includes both aquatic and terrestrial stages. In Illinois, 37 of the 41 amphibian species that occur in Illinois use wetlands at least part of the time (Illinois Department of Natural Resources 1994). Recognizing the value of non-wetlands to the function of wetlands, the bank sponsor will include non-wetlands to generate wetland banking credits; specifically, 13.3 acres of credit for the inclusion of 482 acres of non-wetlands.

Non-wetlands include about 44 acres of deep water habitats within the Mazon River and Mud Slough, 44 acres of floodplain forest and 394 acres of old agricultural fields on non-hydric soils. Uplands will be restored to floodplain forest. Deep water habitats and floodplain forest will be preserved.

Bare root seedlings will be planted in uplands. Approximately 430 seedlings per acre will be planted. The species proposed for planting are common to high quality undisturbed floodplain forest found in the area (Table 3).

Table 3.

Below is a list of candidate trees and shrubs for planting in non-wetlands.

T R E E S

Ohio buckeye	(<i>Aesculus glabra</i>)	FAC+
bitternut	(<i>Carya cordiformis</i>)	FAC
shagbark hickory	(<i>Carya ovata</i>)	FACU
Kentucky coffee tree	(<i>Gymnocladus dioica</i>)	UPL
black walnut	(<i>Juglans nigra</i>)	FACU
white oak	(<i>Quercus alba</i>)	FACU
bur oak	(<i>Quercus macrocarpa</i>)	FAC-
red oak	(<i>Quercus rubra</i>)	FACU
basswood	(<i>Tilia americana</i>)	FACU

S H R U B S

paw paw	(<i>Asimina triloba</i>)	FAC
wahoo	(<i>Euonymus atropurpureus</i>)	FAC-
wafer ash	(<i>Ptelea trifoliata</i>)	FACU+
bladdernut	(<i>Staphylea trifolia</i>)	FAC
maple leaved arrowwood	(<i>Viburnum acerifolium</i>)	UPL
nannyberry	(<i>Virurnum lentago</i>)	FAC+

Site Preparation for Planting

Site preparation for tree and shrub planting will depend on the vegetation cover. Fields with a herbaceous or shrub cover of non-invasive species will be mowed, and trees and shrubs will be planted in the stubble. Fields with a patchwork of invasive species will be selectively mowed and treated with herbicides. A pre-emergent herbicide such as Oust or Simazine will be used. Fields with a pure cover of invasive species will be plowed, treated with herbicides and seeded with a nurse crop (Table 4). Some species of native plants may be added to the cover crop mix, otherwise the Illinois Department of Transportation expects the herbaceous layer will consist of volunteer species.

Table 4.

Nurse crop for tree and shrub plantings.

A N N U A L S

redtop	(<i>Agrostis alba</i>)	FACW 3 pounds/acre
timothy	(<i>Phleum pratense</i>)	FACU 3 pounds/acre
annual rye	(<i>Secale cereale</i>)	UPL 50
pounds/acre		

N A T I V E P L A N T S (optional)

stout wood reed	(<i>Cinna arundinacea</i>)	FACW
Virginia wild rye	(<i>Elymus virginicus</i>)	FACW-
smartweed	(<i>Polygonum punctatum</i>)	OBL
goldenglow	(<i>Rudbeckia laciniata</i>)	FACW+

Herbicides will be applied over an entire field before planting or in bands immediately after planting. Bands will be four feet in width and will be located between rows of planted trees. If "green-up" occurs, a post-emergent and pre-emergent herbicide mixture will be applied.

Maintenance of Plantings

Tall or weedy growth between the rows of planted trees and shrubs will be mowed during July 15 through September 30 as needed. Two to three years beyond the period of establishment, plantings may require further maintenance. The need for maintenance will be determined on a case by case or field by field basis. Annual monitoring reports will provide the recommendations for maintenance of plantings.

Fields with poor survival of planted trees and shrubs will be replanted or one of the stated contingency measures (see Section XII) will be considered.

Problems with some invasive species should diminish as young forests mature, tree canopies close and herbaceous layers become shaded.

Schedule of Plantings

Table 5.

This table lists the sequence of events leading to reforestation of the Morris bank site. Planting will take place as needed from March 1 through May 15. Field numbers are listed on Figure 2.

Field Numbers	Activity	Season/Year	Approximate Acreage
15	deactivate drain tile	summer/2002	
	site preparation	autumn/2002	as needed
	tree and shrub planting	spring/2003	115
	maintenance	summer/2003	115
3, 4, 13, 14, 16	site preparation	autumn/2003	as needed
	tree and shrub planting	spring/2004	50
	maintenance	summer/2004	165
1, 5, 6, 7, 8, 9, 12	site preparation	autumn/2004	as needed
	tree and shrub planting	spring/2005	120
	maintenance	summer/2005	285
2, 10, 11	site preparation	autumn/2005	as needed
	tree and shrub planting	spring/2006	225
	maintenance	summer/2006	511
17, 18	site preparation	autumn/2006	as needed
	tree and shrub planting	spring/2007	65
	maintenance	summer/2007	576

V. Description of baseline conditions at the bank site

Existing Wetland and Upland Habitats

An on-site evaluation of vegetation, soils, topography, and hydrology was performed by the Illinois Natural History Survey. Natural communities within the site were quantitatively sampled and characterized. All potential wetlands were examined, and determinations were performed. Soils were examined, and the accuracy of the soil survey maps for this area was checked. Vegetative cover types, wetlands, and soil units were mapped on aerial photography (see Feist and Wiesbrook, Appendix 1). The area of each cover type or wetland and upland habitat was determined from measurements taken off of aerial photography (Table 6). Approximately 65 acres of the site is occupied by the Mazon River and Mud Slough.

Table 6.

Vegetative cover types occurring at the bank site. Approximately 65 acres of the site consists of open water (i.e. Mazon River and Mud Slough).

Habitat type	Acreage	Dominant species
Floodplain forest (wetland)	148.2	Overstory: <i>Acer saccharinum</i> Sapling layer: <i>Acer saccharinum</i> Shrub layer: <i>Sambucus canadensis</i> Herbaceous layer: <i>Laportea canadensis</i> , <i>Cryptotaenia canadensis</i> , <i>Sanicula gregaria</i>
Floodplain forest (non-wetland)	65.0	Overstory, Sapling layer, and Shrub layer: <i>Celtis occidentalis</i> , <i>Aesculus glabra</i> Herbaceous layer: <i>Laportea canadensis</i> , <i>Elymus virginicus</i> , <i>Sanicula gregaria</i>
Wet shrubland	5.2	Shrub layer: <i>Acer negundo</i> , <i>Salix exigua</i> , <i>Ulmus americana</i> Herbaceous layer: <i>Elymus virginicus</i> , <i>Aster simplex</i>
Wet meadow/woodland complex	60.2	Overstory: <i>Acer saccharinum</i> Sapling layer: <i>Acer saccharinum</i> Shrub layer: <i>Acer saccharinum</i> , <i>Salix exigua</i> Herbaceous layer: <i>Ambrosia trifida</i> , <i>Laportea canadensis</i> , <i>Elymus virginicus</i>
Marsh	1.3	Herbaceous layer: <i>Leersia virginica</i> , <i>Lemna minor</i> , <i>Aster simplex</i>
Pond	8.3	
Non-native grassland	5.0	Herbaceous layer: Non-native grasses
Agricultural land (farmed wetland)	468.0 (5)	Herbaceous layer: Annual weeds
Developed land	5.0	Herbaceous layer: Non-native grasses

Approximately four acres of farmed wetlands were delineated by the Natural Resources Conservation Service on April 4, 2001. A copy of the Natural Resources Conservation Service wetland map is presented on Figure 3.

Endangered and Threatened Species and Natural Quality Determination

A search was conducted for rare, endangered and threatened flora and high quality plant communities during the 1999 growing season. In the search, 15 communities were identified: 13 mesic-floodplain forest/floodplain forest communities and 2 shrubland communities. On a scale of A (best) through D, all communities were graded C or lower. None of the natural communities were of Illinois natural areas inventory quality. No endangered or threatened plant species were found within the bank site (see Handel 2000, Appendix 2).

Soils and Topography

A map of the soils of the bank site is included in this report (USDA-Soil Conservation Service 1980) (Figure 4). Soil mapping was field checked by the Illinois Natural History Survey. Some soil boundaries were adjusted slightly and inclusions(<5 acre) of hydric soils were delineated (see Figure 1 of Appendix 1). The area of inclusions was added to the total acreage of hydric soil available for wetland restoration.

Four dominant Natural Resources Conservation Services soil mapping units comprising three soil series account for over 98.5% of the soils at this site. These three series (Ross, Lawson, and Sawmill) form a typical central Illinois drainage catena. Ross is well drained, Lawson somewhat poorly drained and Sawmill poorly drained. Sawmill is the only hydric member of this catena, while both Lawson and Ross may contain inclusions of Sawmill.

Topography of the site is depicted graphically on Figure 2. Most of the site is level, and slopes are zero to two percent. The banks of the entrenched Mazon River are very steep, and slopes are more than 30 percent. Mud Slough is less entrenched, and bank slopes are less than the Mazon.

Hydrology

The hydrology at the bank site is driven by surface water from the Mazon and Illinois Rivers. At the nearby Morris gauging station, records from the past 50 years indicate that the site floods to an average elevation of 488.0 feet for 7 consecutive days per year, 486.3 feet for 14 consecutive days, and 485.4 feet for 21 consecutive days.

Initial studies conducted by the Illinois State Geological Survey show that ground water was observed at depths between 6.5 and 13 feet below land surface over much of the site, decreasing in elevation to the north where ground water and the elevation of the Illinois River are of similar elevation. Near the southern boundary of the site, ground water was observed to be between 1.5 and 3 feet below land surface. Ground water discharge is suggested at certain times of the year, near the base of the high ground along the southern boundary of the site. This discharge is likely to occur only in a very limited area, south of any ditches or streams on site. No upward ground water gradient

has been observed at the site. Although a perched water-table is possible in the northern parts of the site, no near-surface ground water has been observed to date.

Drain tile lines have been located within the bank site; however, the extent of this hydrological modification is unknown at this time. The channel of the Mazon River appears to be entrenched, and this is probably due to channelization upstream in the watershed. Long-term monitoring by the Illinois State Geological Survey will determine the area of the wetland bank that has wetland hydrology.

Almost the entire bank site is within the floodway of the Illinois River. Only a small portion at the southeast corner is out of the floodway and within the 100 year flood boundary (Federal Emergency Management Agency 1985).

The proposed bank site is not within a drainage district (personal communication with Patty Eddy of Grundy County in 1999 and Illinois Department of Business and Economic Development Division of Water and Natural Resources in 1971).

VI. Geographic service area

The service area the bank will cover is depicted on Figure 5. The service area falls entirely within the Rock Island District of the U.S. Department of the Army, Corps of Engineers and largely within Illinois' Grand Prairie natural division (Schwegman 1973).

For activities regulated under Section 10/404 and the Illinois Interagency Wetland Policy Act of 1989, use of the Morris bank to compensate for impacts beyond the designated service area may be authorized, on a case-by-case basis, where it is determined to be practicable and environmentally desirable.

Wetland impacts that occur outside of the Illinois River upper basin and that are compensated at the bank site will be subject to (higher) ratios in accordance with 17 Ill. Administrative Code 1090.20 (Implementing Procedures for the Illinois Interagency Wetland Policy Act of 1989).

Designation of a more inclusive service area is proposed because the bank site will be used to compensate for highway projects that typically involve numerous small impacts in several different watersheds.

VII. Wetland classes or other aquatic resource impacts suitable for compensation

Impacts to all wetland classes (i.e. emergent, scrub-shrub and forested) will be eligible for compensation at the Morris bank site, even though bank credits will be generated through the preservation, enhancement and restoration of only forested wetlands. The Illinois Department of Transportation will request case-by-case that out of kind compensation be granted at the bank site. A request for out of kind mitigation will be made during the permit application process. Most Illinois Department of Transportation impacts are to forested wetlands.

The decision to reforest the entire bank site was based on wildlife habitat needs, early (mid-1800s) government land survey notes and modern soils information. According to scientists at the Illinois Natural History Survey, large contiguous tracts of floodplain

forest in the upper valley of the Illinois River are rare and are important to forest bird species. The presettlement vegetation of the bank site was floodplain forest and soils information indicates that the original vegetation was scattered trees and tall grasses.

VIII. Methods for determining credits and debits

The Illinois Department of Transportation will not use a wetland functional assessment methodology to determine credits or debits but will use acreage as a surrogate for measuring function. All planned wetlands (i.e. restorations and enhancements) will qualify for certification only after attainment of the approved performance standards (see Section X). The Mitigation Bank Review Team Chair will be responsible for certifying wetland credits.

IX. Accounting procedures

The Illinois Department of Transportation will begin development of the wetland bank within one year of approval of this instrument and will complete the work in one phase. Upon approval of the bank instrument, the bank will be credited with 48.6 acres of wetland credit. It includes the 9.4 acres of certified credit for preservation of 93.9 acres of existing wetlands and an additional 39.2 acres of uncertified credit.

As areas within the bank achieve the approved performance standards, the Illinois Department of Transportation will submit supporting information from the monitoring reports to the Mitigation Bank Review Team Chair and request certification of these areas (5 acre minimum size) for wetland credit. The Illinois Department of Transportation will also submit a copy of the bank ledger showing the proposed credit. The Mitigation Bank Review Team Chair will respond by either accepting or denying the new balance. If denied, the Mitigation Bank Review Team Chair will provide an explanation of the basis for the denial.

No additional credits will be generated for use in the bank beyond the initial 48.6 acres until all of the original 39.2 acres of uncertified credits have been converted to certified credits.

Different compensation ratios are used for federal and state purposes (see Section XIV). In addition, the federal and state policies on the use of uncertified credits are different (uncertified credits may be applied on a 1:1 basis for state purposes whereas federal policies call for 1.5 acres of uncertified credit to provide 1 acre of compensation). Since the state ratios will generally require compensation amounts equal to or greater than the federal ratios, the state ratios will be applied for purposes of determining the amount of credits needed to provide the required compensation on highway projects allowed to use the bank.

As needed, the Illinois Department of Transportation will submit to the Mitigation Bank Review Team Chair a request to debit the bank via the Section 404 or 10 permit application or wetland impact evaluation process. The request or permit application will include a copy of the bank ledger and a line item indicating the proposed debit. The Mitigation Bank Review Team Chair will respond by approving or denying the request.

The Illinois Department of Transportation, Bureau of Design and Environment will be the banker for the department. As banker, the bureau will coordinate certification of credits, maintain the bank ledger (see Table 7), and coordinate with the Mitigation Bank Review Team departmental and local agency requests for debiting.

Table 7.

Format of the wetland bank ledger with sample entries. No additional credits will be generated for use in the bank beyond the initial 48.6 acres until all of the original 39.2 acres of uncertified credits have been converted to certified credits. The second or lower table will be used to track certification of the original 39.2 acres of uncertified credits.

Morris wetland bank					
file no.	date	transaction	credit	debit	balance
		instrument approved	48.6		48.6
1001-d		FAP 326 (IL Rt. 47) Contract No. 3202		37.1	11.5
1003-c		additional certified credits	0.8		12.3
1004-c		additional certified credits	20		32.3

Credit certification					
file no.	date	transaction	cert.	uncert.	total credits
		instrument approval	9.4	39.2	48.6
1002-c		parcel 1002 cert. of 10 acres	19.4	29.2	48.6
1003-c		parcel 1003 cert. of 30 acres	49.4	0	49.4
1004-c		parcel 1004 cert. of 20 acres			69.4

X. Performance standards for determining credit availability and bank success

Two performance standards have been established to judge success of the planned wetlands and credit availability at the bank site.

- A. Each planned wetland should be a jurisdictional one as defined by current federal standards.
 - 1. Predominance of hydrophytic vegetation. More than 50% of the dominant plant species must be hydrophytic.
 - 2. Presence of hydric soils. Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist.
 - 3. Presence of wetland hydrology. The planned wetlands must be either permanently or periodically inundated at average depths less than 6.6 feet or have soils that are saturated to the surface for at least 12.5% of the growing season.
- B. Each planned wetland should meet standards for planted species survival and floristic composition.
 - 1. Planted species survivorship. At least 80% of the planted trees and shrubs should be established and living.
 - 2. Native species composition. At least 90% of the plants present should be non-weedy, native, perennial and annual species.
 - 3. Dominant plant species. None of the dominant plant species may be non-native or weedy species, such as cattails, sandbar willow, or reed canary grass.

XI. Reporting protocols and monitoring plan

Before construction, the Illinois Department of Transportation will submit to the Mitigation Bank Review Team Chair for his/her review, plans and specifications for earthwork (i.e., tile removal) and plantings. If no response is received within six weeks, tacit approval will be assumed.

During construction, the Illinois Department of Transportation will notify the Mitigation Bank Review Team Chair before and after earthwork and plantings. As-built plans will be prepared by the Illinois Department of Transportation and submitted to the Mitigation Bank Review Team Chair.

After construction, annual monitoring reports will be submitted to the Mitigation Bank Review Team Chair by September 30. The Illinois Department of Transportation will monitor for attainment of each of the above-stated performance standards. In cases of non-attainment, the reports will provide recommendations for maintenance or remediation.

Monitoring will begin after the period of establishment for trees and shrubs. If planted before June 1, monitoring will begin the following autumn; if after, the following spring. The Illinois Department of Transportation will generally follow the level II procedures for monitoring as described in the Illinois Wetland Restoration and Creation Guide (Admiraal et al. 1997).

Hydrology will be monitored by the Illinois State Geological Survey. Soil-zone monitoring wells, surface water staff gauges or continuous recording devices (data logger) will be employed to monitor depth of surface water or depth to ground water. Bi-weekly measurements in springtime and monthly measurements during the remainder of the year are normally adequate to determine if the wetland hydrology criterion has been satisfied. The locations of monitoring wells, rain gauges, and stage gauges is depicted on Figure 6. Locations and quantities of monitoring equipment are believed to be sufficient for making determinations of the presence of wetland hydrology in all planned wetlands.

Vegetation will be monitored by the Illinois Natural History Survey. A systematic sampling scheme will be employed at all planned wetlands. A baseline will be set up at the edge of each site. Transects will run perpendicular to the baseline at 164 foot intervals. Quadrats (33 feet by 33 feet) will be placed at 164 foot intervals along each transect. Transects and quadrats will always be placed at least 33 feet from the edge of the planned wetland. The location of sampling transects is depicted on Figure 7.

All living planted trees within each quadrat will be counted. All volunteer trees over 3.3 feet tall will also be counted. A 3.3 foot by 3.3 foot quadrat will be placed in the north-east corner of each 33 foot by 33 foot quadrat. Percent cover for each herbaceous species present will be recorded.

XII. Contingency and remedial actions and responsibilities

There is the possibility that areas will be wetter or drier than planned. If a planned enhancement or restoration area does not have wetland hydrology, the Illinois Department of Transportation will most likely forego the wetland credits and not do anything to try and create wetland hydrology.

There is the possibility that some areas will flood longer than planned and planted trees will die. If numbers drop below the performance standards, then the Illinois Department of Transportation may propose replanting or allowing for natural regeneration by flood tolerant species such as silver maple (*Acer saccharinum*). In some cases the planned wetland type may have to be changed in order to fit an area's hydrology. For example, an emergent marsh may be more appropriate where a floodplain forest was originally planned.

There is the possibility that some plantings will be overcome by natural growth and survivorship of planted trees will be low. If the floristic quality is moderate to high and the vegetation is dominated by hydrophytic plants, then the Illinois Department of Transportation will request that the Mitigation Bank Review Team consider granting restoration of that area through natural regeneration. If floristic quality is low, the Illinois Department of Transportation will consider mowing or applying herbicides or even

replanting. If floristic quality is moderate and tree stocking is very high, a third option may consist of thinning a timber stand to improve quality.

XIII. Financial assurances

The Illinois Department of Transportation will program funds for remediation in the event there is failure at one or more of the planned wetlands. The Illinois Department of Transportation will not post performance bonds, hold escrow accounts or dedicate legislatively enacted funds to cover contingency measures.

Remediation or replanting will be funded by the Illinois Department of Natural Resources through their State Nursery Program.

Monitoring of planned wetlands will be funded and implemented by the Illinois Department of Transportation through their contract with the Illinois Natural History and State Geological Surveys.

XIV. Compensation ratios

Typically, a 1.5:1.0 replacement to impact ratio has been applied by federal agencies to determine wetland compensation. However, ratios are usually higher under the Illinois Interagency Wetland Policy Act of 1989 (Table 8). In all cases, the Illinois Department of Transportation will apply the state ratios.

Table 8.

Wetland compensation ratios used to determine compensation under the Illinois Interagency Wetland Policy Act of 1989.

	Location of the replacement wetland		
Degree of adverse impact	On-site	Off-site	Out-of-basin
Minimal alteration	1.0 : 1.0* 1.5 : 1.0**	1.5 : 1.0	2.0 : 1.0
Significant alteration	1.5 : 1.0	2.0 : 1.0	3.0 : 1.0
Destruction	2.5 : 1.0	4.0 : 1.0	5.5 : 1.0

- * The 1.0 : 1.0 ratio applies to all other types of wetland vegetation, substrate, or wetland type except those wetlands that have woody vegetation

** This ratio applies if the vegetation of the adversely impacted wetland is woody.

A ratio of 5.5:1.0 is always used if any of the following situations occurs:

- The presence of a listed species.
- The presence of essential habitat of a listed species.
- The presence of an Illinois Natural Areas Inventory site.
- A wetland that is composed of a plant community that has a floristic quality native index score of 20 or more.

XV. Provisions for long-term management and maintenance

The Illinois Department of Transportation will transfer title to the bank site after all credits are certified. Credit withdraw by the Illinois Department of Transportation could continue after transfer. Transfer will be to the Illinois Department of Natural Resources. The Illinois Department of Natural Resources will assume responsibility for managing the bank site in accordance with the approved mitigation bank site prospectus and wetlands site development plan and will provide for the long-term protection of the wetland credit areas.

No conservation easements or deed restrictions will be necessary for the protection of wetlands since title will be transferred to the Illinois Department of Natural Resources.

XVI. Signatories

In accordance with the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, this document has been prepared to describe the provisions for establishment, use and operation of the Morris wetland bank site in Grundy County, Illinois by the Illinois Department of Transportation.

The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the Morris site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

ILLINOIS DEPARTMENT OF TRANSPORTATION

By: _____
Secretary

Date: _____

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

By: _____
Director

Date: _____

U.S. ENVIRONMENTAL PROTECTION AGENCY
Watersheds and Wetlands Branch

By: _____
Kevin Pierard, Chief

Date: _____

U.S. FISH AND WILDLIFE SERVICE
Rock Island Ecological Services Field Office

By: _____
Richard C. Nelson, Supervisor

Date: _____

UNITED STATES ARMY DISTRICT ENGINEER

By: _____
Colonel William J. Bayles

Date: _____

XVII. References

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Figures

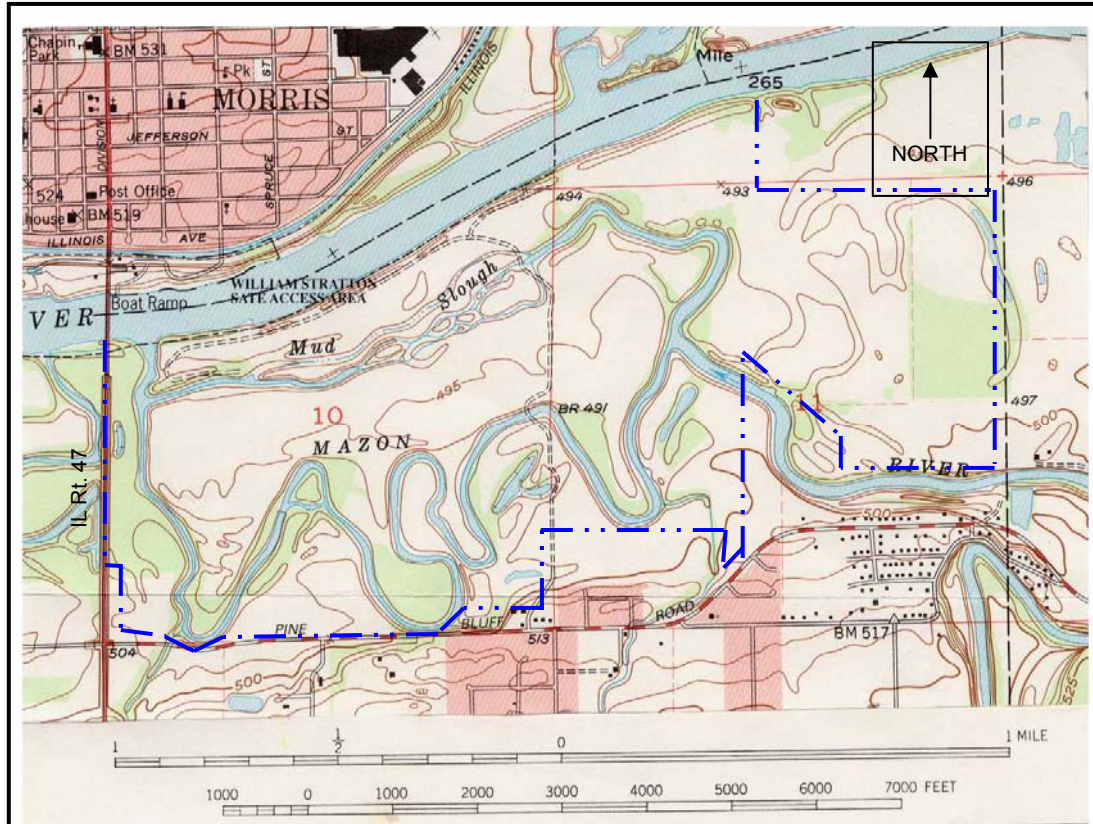


Figure 1. Map of the proposed wetland bank site (outlined) and vicinity on the Morris, IL (US Geological Survey 1993) topographic map of the area.

Figure 2. General site plan--in the envelope on the back page of this document

Figure 3. Natural Resources Conservation Service map of the wetlands within the bank site. FWs are farmed wetlands and Ws are wetlands. There are approximately 4.0 acres of farmed wetland mapped within the entire 831 acre site.

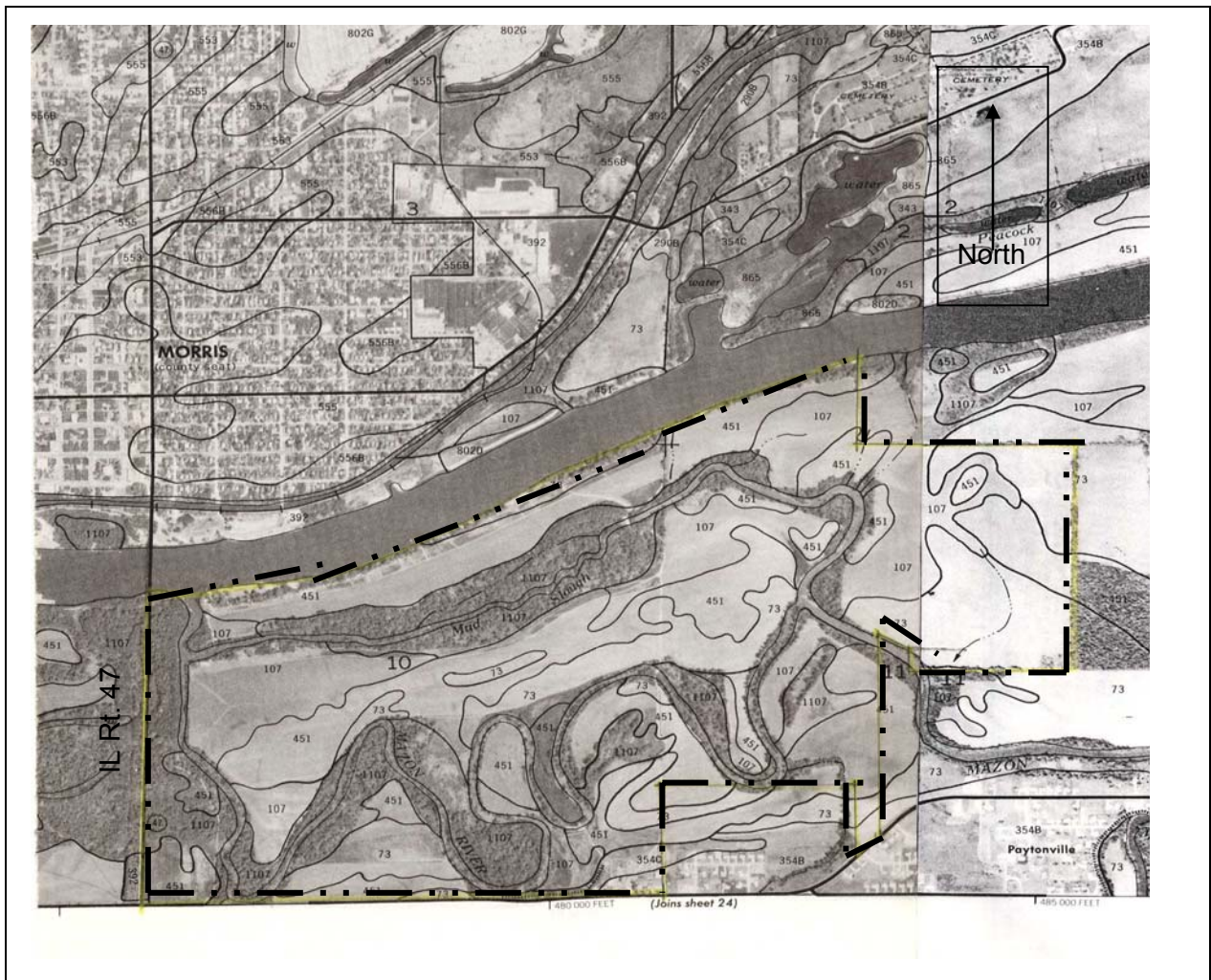


Figure 4. Natural Resources Conservation Survey soils map of the proposed wetland bank site near Morris, IL (USDA-Soil Conservation Service 1980).

Legend

Map Symbol	Name	Taxonomy	Drainage class
107	Sawmill	Cumulic Haplaquoll	Poorly drained
1107	Sawmill	Cumulic Haplaquoll	Poorly drained
451	Lawson	Cumulic Hapludoll	Somewhat poorly drained
73	Ross	Cumulic Hapludoll	Somewhat poorly drained
354C	Honoegah	Entic Hapludoll	Excessively drained
354B	Honoegah	Entic Hapludoll	Excessively drained

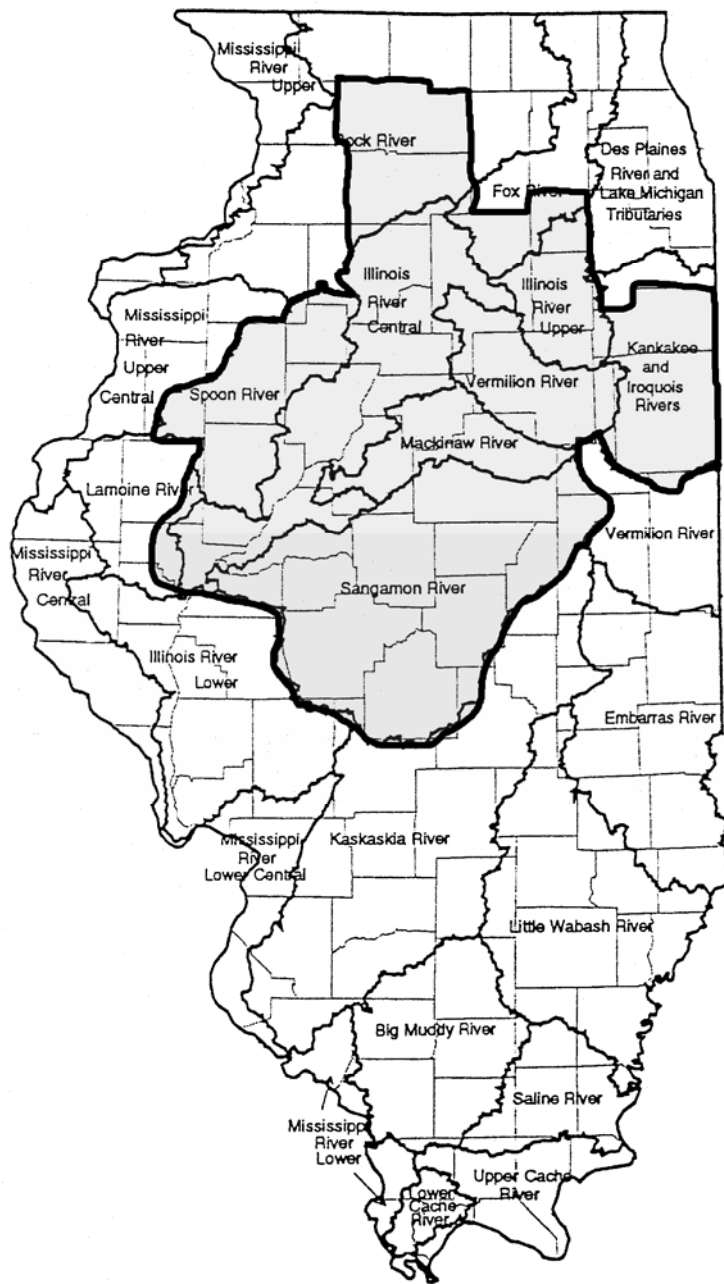


Figure 5. The bank's service area will consist of the shaded portion of the above map. The bank site is located in the Illinois River Upper basin. In accordance with 17 Ill. Admin. Code 1090.20 (Implementing Procedures for the Interagency Wetland Policy Act), wetland impacts outside of the basin and that are compensated at the bank site will be subject to higher replacement ratios.

Figure 6. Illinois State Geological Survey instrument locations at the wetland bank site near Morris, Illinois.

Figure 7. Location of transects for monitoring vegetation.

Appendices

Appendix 1. Mitigation site assessment for the Morris wetland bank

Mitigation Site Assessment for the Morris Wetland Bank Grundy County, Illinois

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Center for Wildlife Ecology
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Champaign, IL 61820
(217) 244-6858 and 265-0368

Introduction and Project Summary

A mitigation site assessment for the proposed 850 acre mitigation bank in Grundy County was conducted on 26-27 May, 13-14 June, and 13 and 27 July 1999. The following sources were examined while surveying the project area and preparing this report: United States Geological Survey topographic maps and National Wetland Inventory (NWI) maps (Morris 7.5 minute quadrangle); *Soil Survey of Grundy County, Illinois*; aerial photographs; *National List of Plant Species that Occur in Wetlands: Illinois*; and the 1987 *Corps of Engineers Wetlands Delineation Manual*.

An onsite evaluation of vegetation, soils, topography, and hydrology was performed. Natural communities within the site were quantitatively sampled and characterized. All potential wetlands were examined and determinations were performed. Soils were examined and the accuracy of the soil survey maps for this area was checked. In addition, the potential for wetland restoration and creation was evaluated. Vegetative cover types, wetlands, and soil units were mapped on aerial photographs (Appendix C).

This report contains the results of the vegetation sampling and soil mapping, as well as an evaluation of the potential of this site for restoration and creation. The results of the wetland determinations are included at the end of this report as Appendix B.

Methods

Soils

The soils were mapped using modified soil survey soil mapping methods (Soil Survey Division Staff, 1993). Sampling points were determined using topographic and plant community borders. All of the soils present at this site are cumulic (mollic epipedon >50 cm thick). Since the presence of the cumulic epipedon masks redoximorphic features near the surface, many soil boundaries were chosen based on presence or absence of redoximorphic features immediately below the mollic epipedon. This may result in erroneous mapping but cannot be avoided.

Vegetation

Cover types were determined during the onsite evaluation of the site. Natural plant communities (cover types 1 - 6) were investigated further by quantitative sampling.

Table 1. Dominant NRCS-Mapped Soil Map Units in Project Area (USDA-SCS, 1980).
ROSS SILT LOAM (Map unit 73) :

Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Well drained

Subject to very brief flooding March through June
Apparent high water table >6 feet February through April
Formed in loamy alluvium on flood plains and low terraces
Potential for creation of pond reservoir areas: Restricted due to seepage concerns
Dominantly Ross; <12% inclusions of Sawmill and Lawson

LAWSON SILT LOAM (Map unit 451) :

Fine-silty, mixed, superactive, mesic Aquic Cumulic Hapludolls
Somewhat poorly drained

Subject to occasional, brief flooding March through November
Apparent high water table 1-3 feet November through May
Formed in silty alluvium on flood plains
Potential for creation of pond reservoir areas: Restricted due to seepage concerns
Dominantly Lawson; 5-10% inclusions of Ross and Sawmill

SAWMILL SILTY CLAY LOAM (Map unit 107, 1107) :

Fine-silty, mixed, superactive, mesic Cumulic Endoaquolls
Poorly drained

Subject to frequent, brief flooding March through June
Apparent high water table 0-2 feet March through June
Formed in alluvium on flood plains
Potential for creation of pond reservoir areas: Favorable
Dominantly Sawmill; <15% inclusions of Lawson

Vegetation

As a result of the onsite evaluation, nine cover types were found to exist at this site (Appendix C Figure 2). These were as follows: 1) floodplain forest (wetland), 2) floodplain forest (non-wetland), 3) wet shrubland, 4) wet meadow/woodland complex, 5) marsh, 6) pond, 7) non-native grassland, 8) agricultural land, and 9) developed land. These cover types are mapped on the accompanying aerial photograph (Figure 1) and are summarized in Table 2 below.

(40-70 yrs), however, some areas were more recently reforested (early second growth 10-20 yrs).

Floodplain forest (non-wetland) occurred on somewhat poorly drained soils (Lawson) throughout the project area. Over seven species of trees were found in the overstory, with *Celtis occidentalis*, *Aesculus glabra*, *Acer negundo*, and *Acer saccharinum* being the most common (Table 2A). Twelve species occurred in the understory; the most common saplings were *Celtis occidentalis* and *Aesculus glabra* (Table 6A) while the dominant shrubs were *Celtis occidentalis*, *Aesculus glabra*, and *Sambucus canadensis* (Table 10A). The dominant understory species were *Laportea canadensis*, *Elymus virginicus*, *Sanicula gregaria*, and *Cryptotaenia canadensis* (Table 14A). Tree densities averaged 386 stems/ha with an average dbh (cm) of 23.9. The understory was fairly dense, with saplings having a density of 257 stems/ha and shrubs averaging 1129 stems/ha. Most of the floodplain forest (non-wetland) was mature second growth (40-70 yrs).

Wet shrubland occurred on poorly drained soils (Sawmill) throughout the project area. Diversity was very low, with just four species in the overstory and seven in the understory. Dominant tree species were *Acer saccharinum* and *Salix exigua* (Table 3A). *Salix exigua*, *Acer saccharinum*, and *Fraxinus pennsylvanica* were the most common sapling species (Table 7A), while *Acer negundo*, *Salix exigua*, and *Ulmus americana* were the most numerous shrubs (Table 10A). The most common species in the herbaceous layer were *Elymus virginicus*, *Aster simplex*, and *Lysimachia nummularia* (Table 15A). Woody vegetation cover was very dense in these areas and saplings and shrubs were dominant. Tree densities averaged 767 stems/ha with an average dbh (cm) of 14.3. Sapling density was 2067 stems/ha and shrub density was 1233 stems/ha. This is an early successional community (5-20 yrs).

Wet meadow/woodland complex occurred on poorly drained soils (Sawmill) on either side of Mud Slough. Aerial photographs from 1940, 1954, 1967, and 1980 show that this area was densely forested prior to 1980. A large percentage of the trees have since been removed and this area is predominantly an open meadow with scattered patches of trees. Diversity in this area was low. Seven species occurred in the overstory and nine in the understory. *Acer saccharinum*, *Morus alba*, and *Fraxinus pennsylvanica* were the most commonly occurring trees (Table 4A). The most common sapling and shrub were *Acer saccharinum* and *Sambucus canadensis*, respectively (Table 8A, Table 12A). Dominant species in the herbaceous layer were *Ambrosia trifida*, *Laportea canadensis*, and *Elymus virginicus* (Table 16A). The density for tree species was low, 24 stems/ha while the average dbh (cm) is 25.46. There were 318 saplings/ha and 141 shrubs/ha. This is an early successional community with patches of older trees remaining from the denser forest that occurred at this site prior to 1980.

Marsh occurred at one location in the project area. Dominant species were *Leersia virginica*, *Lemna minor*, and *Aster simplex* (Table 17A). Diversity was low at this site. Although it had up to two feet of standing water at the time of the survey, it dried out completely in late summer.

recommend a survivorship of at least 50% for all planted species. A higher percentage would probably be unachievable without repeated replantings.

We recommend that all wetland restoration sites be planted. Wetland sites that are not planted are likely to become mostly solid stands of silver maple or willow and remain so for many years.

Wetland Enhancement

There are approximately 20 acres of farmed wetland that have hydric soils and can be enhanced by planting floodplain forest tree species such as those mentioned above (Appendix C Figure 3). There is also an area 60.2 acres in size that could be enhanced. This is the wet meadow/woodland complex on either side of Mud Slough. Prior to 1980 this area was second growth floodplain forest, however, it has since been severely disturbed. This bottomland could support a wet floodplain forest or savanna community. Tree species such as *Populus deltoides* and *Quercus palustris* and herbaceous species such as *Cinna arundinacea*, *Elymus virginicus*, *Rudbeckia laciniata*, and *Spartina pectinata*, should be planted here.

Wetland Creation

There are a few sites within the project area that may be suitable for the creation of marsh and/or wet prairie (Appendix C Figure 3). The actual suitability of these sites, however, will not be known until more topographic and hydrologic information is obtained. The sites are as follows:

1. The field at the corner of Pine Bluff Road and IL 47: A small area of Sawmill soil occurs at the north central part of this field. It may be possible to extend and expand this area by excavating a foot or two of topsoil from adjacent areas.
2. The triangular field just east of this field and along Pine Bluff Road: The same idea could be applied here. The area with Sawmill soil near the southern tip of the triangle could be expanded as well with shallow excavation.
3. The large field on the easternmost section of this site: Wet shrubland and other areas with hydrophytic vegetation have developed in this field in areas that have hydric soils. With more information concerning the hydrology of the area, it may be found to be suitable for marsh/wet prairie communities.

Upland Restoration

We recommend that much of the remaining acreage be restored to mesic floodplain forest communities. A small amount of prairie is also recommended (Figure 3). Restoration of upland areas is discussed in detail in *A Descriptive Study of Morris Wetland Mitigation Bank Including Natural Communities* (Handel 2000).

Discussion

We recommend restoring a large contiguous portion of this land back to floodplain forest rather than having the forest sections separated by open grassland. If open prairie and/or

References

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Table 1A. Morris MSA-tree sampling results 1999. Floodplain forest (wetland) (n=49).

Species	Density (stems/100m ²)	Relative Density	Frequency	Relative Frequency	Dominance (m ² /ha)	Relative Dominance	Average dbh (cm)	Importance Value
<i>Acer saccharinum</i>	253.06	58.77	0.49	30.77	15.64	55.64	24.80	48.39
<i>Celtis occidentalis</i>	53.06	12.32	0.27	16.67	3.28	11.68	24.95	13.56
<i>Fraxinus pennsylvanica</i>	28.57	6.64	0.18	11.54	2.55	9.07	30.64	9.08
<i>Populus deltoides</i>	20.41	4.74	0.10	6.41	3.36	11.97	40.74	7.71
<i>Acer negundo</i>	22.45	5.21	0.18	11.54	0.87	3.09	19.74	6.61
<i>Juglans nigra</i>	12.24	2.84	0.08	5.13	0.75	2.65	26.97	3.54
<i>Quercus macrocarpa</i>	10.20	2.37	0.06	3.85	0.34	1.21	19.96	2.48
<i>Ulmus americana</i>	6.12	1.42	0.06	3.85	0.19	0.69	17.86	1.99
<i>Tilia americana</i>	4.08	0.95	0.04	2.56	0.31	1.11	28.96	1.54
<i>Crataegus mollis</i>	4.08	0.95	0.04	2.56	0.27	0.96	25.78	1.49
<i>Morus alba</i>	6.12	1.42	0.02	1.28	0.15	0.53	17.19	1.08
<i>Aesculus glabra</i>	6.12	1.42	0.02	1.28	0.11	0.40	14.22	1.03
<i>Gymnocladus dioica</i>	2.04	0.47	0.02	1.28	0.21	0.74	36.07	0.83
<i>Carya cordiformis</i>	2.04	0.47	0.02	1.28	0.07	0.25	21.08	0.67
	430.61						25.84	

Table 2A. Morris MSA-tree sampling results 1999. Floodplain forest (non-wetland) (n=7).

Species	Density (stems/100m ²)	Relative Density	Frequency	Relative Frequency	Dominance (m ² /ha)	Relative Dominance	Average dbh (cm)	Importance Value
<i>Celtis occidentalis</i>	100.00	25.93	0.43	25.00	6.36	29.36	25.33	26.76
<i>Aesculus glabra</i>	114.29	29.63	0.29	16.67	6.07	28.04	23.56	24.78
<i>Acer negundo</i>	100.00	25.93	0.29	16.67	3.03	14.01	18.29	18.87
<i>Acer saccharinum</i>	28.57	7.41	0.29	16.67	1.61	7.44	25.91	10.51
<i>Juglans nigra</i>	14.29	3.70	0.14	8.33	2.50	11.56	47.24	7.87
<i>Fraxinus pennsylvanica</i>	14.29	3.70	0.14	8.33	1.95	8.99	41.66	7.01
<i>Crataegus mollis</i>	14.29	3.70	0.14	8.33	0.13	0.59	10.67	4.21
	385.71						23.89	

Table 5A. Morris MSA-sapling sampling results 1999. Floodplain forest (wetland) (n=49).

Species	Density*	Relative density	Frequency	Relative frequency	Importance value
<i>Acer saccharinum</i>	0.94	33.33	0.12	12.00	22.67
<i>Acer negundo</i>	0.37	13.04	0.22	22.00	17.52
<i>Fraxinus pennsylvanica</i>	0.24	8.70	0.18	18.00	13.35
<i>Celtis occidentalis</i>	0.35	12.32	0.10	10.00	11.16
<i>Euonymus atropurpureus</i>	0.39	13.77	0.06	6.00	9.88
<i>Aesculus glabra</i>	0.10	3.62	0.08	8.00	5.81
<i>Juglans nigra</i>	0.08	2.90	0.06	6.00	4.45
<i>Ulmus americana</i>	0.18	6.52	0.02	2.00	4.26
<i>Morus alba</i>	0.04	1.45	0.04	4.00	2.72
<i>Carya cordiformis</i>	0.02	0.72	0.02	2.00	1.36
<i>Crataegus mollis</i>	0.02	0.72	0.02	2.00	1.36
<i>Prunus serotina</i>	0.02	0.72	0.02	2.00	1.36
<i>Quercus macrocarpa</i>	0.02	0.72	0.02	2.00	1.36
<i>Tilia americana</i>	0.02	0.72	0.02	2.00	1.36
<i>Ulmus rubra</i>	0.02	0.72	0.02	2.00	1.36

* stems/100 m²

Table 6A. Morris MSA-sapling sampling results 1999. Floodplain forest (non-wetland) (n=7).

Species	Density*	Relative density	Frequency	Relative frequency	Importance value
<i>Celtis occidentalis</i>	1.00	38.89	0.71	41.67	40.28
<i>Aesculus glabra</i>	1.14	44.44	0.57	33.33	38.89
<i>Acer saccharinum</i>	1.14	5.56	0.14	8.33	6.94
<i>Fraxinus pennsylvanica</i>	1.14	5.56	0.14	8.33	6.94
<i>Ulmus americana</i>	1.14	5.56	0.14	8.33	6.94

* stems/100 m²

Table 7A. Morris MSA-sapling sampling results 1999. Wet shrubland (n=3).

Species	Density*	Relative density	Frequency	Relative frequency	Importance value
<i>Salix exigua</i>	8.33	40.32	0.67	16.67	28.49
<i>Acer saccharinum</i>	6.33	30.65	0.67	16.67	23.66
<i>Fraxinus pennsylvanica</i>	1.67	8.06	1.00	25.00	16.53
<i>Ulmus americana</i>	2.33	11.29	0.67	16.67	13.98
<i>Celtis occidentalis</i>	1.00	4.84	0.33	8.33	6.59
<i>Acer negundo</i>	0.67	3.23	0.33	8.33	5.78
<i>Populus deltoides</i>	0.33	1.61	0.33	8.33	4.97

* stems/100 m²

Table 10A. Morris MSA-shrub sampling results 1999. Floodplain forest (non-wetland) (n=7).

Species	Density*	Relative density	Frequency	Relative frequency	Importance value
<i>Celtis occidentalis</i>	4.29	37.97	0.57	20.00	28.99
<i>Aesculus glabra</i>	2.71	24.05	0.86	30.00	27.03
<i>Sambucus canadensis</i>	2.29	20.25	0.43	15.00	17.63
<i>Euonymus atropurpureus</i>	0.71	6.33	0.29	10.00	8.16
<i>Acer negundo</i>	0.43	3.80	0.14	5.00	4.40
<i>Prunus virginiana</i>	0.43	3.80	0.14	5.00	4.40
<i>Carya cordiformis</i>	0.14	1.27	0.14	5.00	3.13
<i>Juglans nigra</i>	0.14	1.27	0.14	5.00	3.13
<i>Ribes missouriense</i>	0.14	1.27	0.14	5.00	3.13

* stems/100 m²

Table 11A. Morris MSA-shrub sampling results 1999. Wet shrubland (n=3).

Species	Density*	Relative density	Frequency	Relative frequency	Importance value
<i>Acer negundo</i>	4.67	37.84	0.67	22.22	30.03
<i>Salix exigua</i>	2.00	16.22	0.67	22.22	19.22
<i>Ulmus americana</i>	2.00	16.22	0.67	22.22	19.22
<i>Acer saccharinum</i>	2.67	21.62	0.33	11.11	16.37
<i>Fraxinus pennsylvanica</i>	1.00	8.11	0.67	22.22	15.17

* stems/100 m²

Table 12A. Morris MSA-shrub sampling results 1999. Wet meadow/woodland complex (n=17).

Species	Density*	Relative density	Frequency	Relative frequency	Importance value
<i>Acer saccharinum</i>	1.47	46.30	0.06	12.50	29.40
<i>Salix exigua</i>	0.94	29.63	0.06	12.50	21.06
<i>Sambucus canadensis</i>	0.12	3.70	0.12	25.00	14.35
<i>Salix nigra</i>	0.47	14.81	0.06	12.50	13.66
<i>Celtis occidentalis</i>	0.06	1.85	0.06	12.50	7.18
<i>Fraxinus pennsylvanica</i>	0.06	1.85	0.06	12.50	7.18
<i>Morus alba</i>	0.06	1.85	0.06	12.50	7.18

* stems/100 m²

Table 13A. *continued*

Species	Average Cover	Relative Cover	Frequency	Relative Frequency	Importance Value
<i>Campsis radicans</i>	0.03	0.03	0.01	0.22	0.13
<i>Carex blanda</i>	0.03	0.03	0.01	0.22	0.13
<i>Glechoma hederacea</i>	0.03	0.03	0.01	0.22	0.13
<i>Menispermum canadense</i>	0.03	0.03	0.01	0.22	0.13
<i>Morus alba</i>	0.03	0.03	0.01	0.22	0.13
<i>Ranunculus</i> sp.	0.03	0.03	0.01	0.22	0.13
<i>Sicyos angulatus</i>	0.03	0.03	0.01	0.22	0.13
<i>Toxicodendron radicans</i>	0.03	0.03	0.01	0.22	0.13
<i>Trillium recurvum</i>	0.03	0.03	0.01	0.22	0.13
<i>Viola erichloa</i>	0.03	0.03	0.01	0.22	0.13
<i>Bidens</i> sp.	0.01	0.01	0.01	0.22	0.11

Table 14A. Morris MSA-herbaceous sampling results 1999. Floodplain forest (non-wetland) (n=14).

Species	Average Cover	Relative Cover	Frequency	Relative Frequency	Importance Value
<i>Laportea canadensis</i>	29.64	22.00	0.64	10.59	16.29
<i>Elymus virginicus</i>	13.57	10.07	0.57	9.41	9.74
<i>Sanicula gregaria</i>	12.32	9.14	0.50	8.24	8.69
<i>Cryptotaenia canadensis</i>	13.75	10.20	0.36	5.88	8.04
<i>Polygonatum biflorum</i>	6.43	4.77	0.43	7.06	5.91
<i>Hydrophyllum virginianum</i>	6.32	4.69	0.43	7.06	5.88
<i>Impatiens pallida</i>	10.00	7.42	0.21	3.53	5.48
<i>Phlox divaricata</i>	4.71	3.50	0.43	7.06	5.28
<i>Eupatorium purpureum</i>	8.04	5.96	0.14	2.35	4.16
<i>Osmorhiza longistylis</i>	5.75	4.27	0.21	3.53	3.90
<i>Smilax hispida</i>	2.57	1.91	0.29	4.71	3.31
<i>Galium aparine</i>	1.71	1.27	0.29	4.71	2.99
<i>Acer saccharinum</i>	0.64	0.48	0.21	3.53	2.00
<i>Parthenocissus quinquefolia</i>	2.14	1.59	0.14	2.35	1.97
<i>Rudbeckia laciniata</i>	2.14	1.59	0.14	2.35	1.97
<i>Alliaria petiolata</i>	1.29	0.95	0.14	2.35	1.65
<i>Menispermum canadense</i>	1.29	0.95	0.14	2.35	1.65
<i>Ambrosia trifida</i>	2.68	1.99	0.07	1.18	1.58
<i>Aster simplex</i>	2.68	1.99	0.07	1.18	1.58
<i>Asarum canadense</i>	1.07	0.80	0.07	1.18	0.99
<i>Euonymus atropurpurea</i>	1.07	0.80	0.07	1.18	0.99
<i>Impatiens capensis</i>	1.07	0.80	0.07	1.18	0.99
<i>Ranunculus abortivus</i>	1.07	0.80	0.07	1.18	0.99
<i>Smilax lasioneuron</i>	1.07	0.80	0.07	1.18	0.99
<i>Toxicodendron radicans</i>	1.07	0.80	0.07	1.18	0.99
<i>Aesculus glabra</i>	0.21	0.16	0.07	1.18	0.67
<i>Celtis occidentalis</i>	0.21	0.16	0.07	1.18	0.67
<i>Eupatorium rugosum</i>	0.21	0.16	0.07	1.18	0.67

Table 17A. Morris MSA- herbaceous sampling results 1999. Marsh (n=4).

Species	Average Cover	Relative Cover	Frequency	Relative Frequency	Importance Value
<i>Leersia virginica</i>	46.88	42.04	0.75	16.67	29.35
<i>Lemna minor</i>	17.63	15.81	1.00	22.22	19.01
<i>Aster simplex</i>	16.38	14.69	0.50	11.11	12.90
<i>Carex sp.</i>	15.63	14.01	0.25	5.56	9.78
<i>Ranunculus secleratus</i>	4.50	4.04	0.50	11.11	7.57
<i>Alisma subcordatum</i>	3.75	3.36	0.25	5.56	4.46
<i>Pilea pumila</i>	3.75	3.36	0.25	5.56	4.46
<i>Acer saccharinum</i>	0.75	0.67	0.25	5.56	3.11
<i>Ambrosia trifida</i>	0.75	0.67	0.25	5.56	3.11
<i>Lysimachia nummularia</i>	0.75	0.67	0.25	5.56	3.11
<i>Phalaris arundinacea</i>	0.75	0.67	0.25	5.56	3.11

Wetland Survey Report for the Morris Wetland Bank Grundy County, Illinois

Introduction and Project Summary

A wetland survey for the proposed 845 acre mitigation bank in Grundy County was conducted on 26-27 May, 13-14 June, and 13 and 27 July 1999. The following sources were examined while surveying the project area to determine wetland locations and boundaries: United States Geological Survey topographic maps and National Wetland Inventory (NWI) maps (Morris 7.5 minute quadrangle); *Soil Survey of Grundy County, Illinois*; aerial photographs; *National List of Plant Species that Occur in Wetlands: Illinois*; and the 1987 *Corps of Engineers Wetlands Delineation Manual*. These materials were used during an onsite evaluation of vegetation, soils, and hydrology.

All potential wetlands within the project corridor were examined. Twenty-eight routine onsite wetland determinations were performed. Results of these determinations are summarized below and are described in more detail on the accompanying forms. The locations of the determination sites are marked on the enclosed aerial photograph (Appendix C Figure 4).

Included with the assessment of a site is its Floristic Quality Index (FQI) (Swink and Wilhelm 1994, Taft et al. 1997). The FQI, although not a substitute for quantitative vegetation analysis in assessing plant communities, provides a measure of the floristic integrity or level of disturbance of a site. Each plant species native to Illinois is assigned a rating between 0 and 10 (Coefficient of Conservatism). This is a subjective indicator of how likely a plant is to be found on an undisturbed site in a natural plant community. A plant species that has a low Coefficient of Conservatism (C) is common and likely to tolerate disturbed conditions. A species with a high C is relatively rare and is likely to require specific undisturbed habitats.

The FQI for a site is calculated from the Coefficients of Conservatism (C) of all species present at that site. The mean C value is calculated using the equation $mCv = \Sigma C/N$, where ΣC represents the sum of the C values for all species recorded at a site, and N is the number of plant species on a site. The C value for each species is shown in the species list for a site. The FQI is then determined by multiplying the mCv by the square root of N [$mCv(\sqrt{N})$]. An FQI below 10 suggests a site of low natural quality; below 5, a highly disturbed site. An FQI of 20 or more suggests that a site has evidence of native character and may be considered an environmental asset.

Stream Characterization

This project is located within the Illinois River basin. The United States Geological Survey (USGS) hydrologic unit code for the watershed is 7120005. The north side of the project is bordered by the Illinois River. The Mazon River runs east to west through the site and drains

wetland. The NWI identifies this site as a temporarily flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1A). The FQI is 13.0 and the mean C value is 2.8. These values are indicative of fair natural quality. This site provides streambank stabilization, floodwater storage, and wildlife habitat of moderate quality.

Site 6: This site occupies the higher areas in the field approximately 266 m (874 ft) west of the gravel road which bisects the project area and runs from 287 to 743 m (943 to 2438 ft) north of Pine Bluff Road. This site does not have dominant hydrophytic vegetation, hydric soils, or wetland hydrology; therefore, it is not a wetland. The NWI identifies this site as a seasonally flooded, emergent, palustrine wetland (PEMC). According to the NRCS, this site is a farmed wetland (FW). The FQI is 8.5 and the mean C value is 1.9. These values indicate poor natural quality. This field was farmed less than one year before the time of the survey. Early successional annual weeds cover the site.

Site 7: This farmed wetland occupies the lower areas in the field approximately 266 m (874 ft) west of the gravel road which bisects the project area and runs from 287 to 743 m (943 to 2438 ft) north of Pine Bluff Road. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; thus, this site is a wetland. The NWI codes this site as a seasonally flooded, emergent, palustrine wetland (PEMC). According to the NRCS, this site is a farmed wetland (FW). The FQI is 8.8 and the mean C value is 1.8. These values are indicative of poor natural quality. This site comprises approximately 1.72 ha (4.26 ac) within the project area. This field was farmed less than one year before the time of the survey. In addition to the typical agricultural weeds, some wetland species have colonized the site. Storage of floodwaters is provided by this site.

Site 8: This wet meadow occupies the lower areas in the field approximately 238 m (782 ft) west of the gravel road which bisects the project area and runs from 49 to 224 m (161 to 736 ft) north of Pine Bluff Road. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; therefore, this site is a wetland. The NWI codes this site as a seasonally flooded, emergent, palustrine wetland (PEMC). The FQI is 7.5 and the mean C value is 1.6. These values indicate poor natural quality. Approximately 0.48 ha (1.19 ac) occur within the project area. This field was farmed less than one year before the time of the survey. A mix of early successional agricultural weeds and hydrophytic species cover this site. This wetland provides storage of floodwaters.

Site 9: This site occupies the higher areas in the field approximately 238 m (782 ft) west of the gravel road which bisects the project area and runs from 49 to 224 m (161 to 736 ft) north of Pine Bluff Road. This site has dominant hydrophytic vegetation, however, hydric soils and wetland hydrology are lacking; therefore, this site is not a wetland. The NWI codes this site as a seasonally flooded, emergent, palustrine wetland (PEMC). The FQI is 5.8 and the mean C value is 1.7. These values are indicative of poor natural quality. This field was farmed less than one year before the time of the survey. Early successional annual weeds cover the site.

Site 10: This farmed wetland occupies the lower areas in the field which is approximately 386 m (1265 ft) west of the gravel road which bisects the project area and runs from 323 to 673 m (1058

the Mazon River. Although dominant hydrophytic vegetation is present, hydric soils and wetland hydrology are not; this site, therefore, is not a wetland. The NWI codes this site as a temporarily flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1A). The FQI is 21.2 and the mean C value is 3.4. These values are indicative of good natural quality. This site provides storage of floodwaters (of short duration), streambank stabilization, and wildlife habitat of fair quality.

Site 16: This young floodplain forest occurs in two parts. One part is a sickle-shaped wetland that branches off from the west side of the Mazon River approximately 435 m (1426 ft) east of the gravel road that bisects the project area and 1122 m (3680 ft) north of Pine Bluff Road. The second part is northwest of the other and is separated by a narrow strip of cropland. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; therefore, this site is a wetland. The NWI did not code this site. The FQI is 10.3 and the mean C value is 2.4. These values indicate fair natural quality. This site is a very young second growth forest comprised mostly of silver maples. This wetland is approximately 2.11 ha (5.21 ac) in size. It provides storage of floodwaters and wildlife habitat of moderate quality.

Site 17: This floodplain forest surrounds Sites 19 and 20. It occurs from 133 to 582 m (1210 to 1909 ft) east of the gravel road that bisects the project area and from 540 to 925 m (1771 to 3036 ft) north of Pine Bluff Road. It runs north to south from the Illinois River to Pine Bluff Road. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; therefore this site is a wetland. The NWI codes this site as a seasonally flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1C). This site comprises 2.83 ha (6.98 ac) within the project area. The FQI is 13.6 and the mean C value is 3.1. These values are indicative of fair natural quality. Floodwater storage and wildlife habitat are provided by this wetland.

Site 18: This floodplain forest occurs from 393 to 589 m (1288 to 1932 ft) east of the gravel road that bisects the project area and 421 m (1380 ft) north of Pine Bluff Road. This site does not have dominant hydrophytic vegetation, hydric soils, or wetland hydrology; therefore, it is not a wetland. The NWI codes this site as a seasonally flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1C). The FQI is 19.3 and the mean C value is 3.2. These values are indicative of fair natural quality. This site provides streambank stabilization, floodwater storage, and wildlife habitat of fair quality.

Site 19: This wet shrubland occurs approximately 498 m (1633 ft) east of the gravel road that bisects the project area and from 736 to 820 m (2415 to 2691 ft) north of Pine Bluff Road. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; thus, this site is a wetland. The NWI codes this site as an intermittently exposed palustrine wetland with an unconsolidated bottom (PUBG). The FQI is 2.8 and the mean C value is 2.0. These values are indicative of very poor natural quality. This wetland comprises approximately 0.79 ha (1.96 ac) occur within the project area. It provides storage for floodwaters and habitat for wildlife.

Site 20: This pond occurs approximately 428 m (1403 ft) east of the gravel road that bisects the project area and from 666 to 890 m (2185 to 2921 ft) north of Pine Bluff Road. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; thus, this site is a wetland. The NWI codes this site as a semipermanently flooded palustrine wetland with an

approximately 23.54 ha (58.17 ac) within the project area. This wetland provides floodwater storage, streambank stabilization, and wildlife habitat of fair quality.

Site 27: This floodplain forest occurs just east of the gravel road that bisects the project area and from 435 to 841 m (1426 to 2760 ft) south of the Illinois River. Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; therefore, this site is a wetland. The NWI codes this site as seasonally flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1C). The FQI is 16.3 and the mean C value is 3.0. These values are indicative of fair natural quality. This wetland comprises approximately 10.90 ha (4.41 ac) within the project area. This wetland provides floodwater storage and wildlife habitat of fair quality.

Site 28: This farmed wetland is approximately 335 m (1100 ft) east of Illinois 47 just north of the Mazon River. The vegetation at this site was not examined closely, however, it is likely that it is very similar in composition to the other farmed wetlands in the project area (Sites 7, 8, 10, and 13). Based on this assumption and the presence of hydric soils and wetland hydrology, we determined that this site is a wetland. The NRCS identified this area as a farmed wetland (FW). The NWI coded this site as upland (U). This farmed wetland is approximately 2.5 ha (6.2 ac). It provides floodwater storage and wildlife habitat of fair quality.

APPENDIX C

FIGURES

Appendix 2. A descriptive study of Morris wetland mitigation bank including natural communities Grundy County

A Descriptive Study of Morris Wetland Mitigation Bank
Including Natural Communities
Grundy County
Illinois Department of Transportation Project Area:
Endangered and Threatened Species and Natural Quality Determination

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March 1, 2000
Center for Biodiversity
Technical Report 2000 (16)

Prepared for:
Illinois Department of Transportation
Bureau of Design and Environment
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All noteworthy areas are classified as Statewide Significant, Statewide Exceptional, Regionally Significant, or Regionally Exceptional as described by White (1978). Definitions of these terms are as follows.

Statewide Significant Natural Area - natural community or assemblage of natural communities that appears to meet the standards of the Natural Areas Committee with the Illinois Department of Natural Resources (IDNR) Division of Natural Heritage for inclusion in the Illinois Natural Areas Inventory (INAI). These sites qualify as Category I natural areas. Category I natural areas are high-quality terrestrial or wetland natural communities (White 1978). Category II natural areas support endangered species or concentrations of two or more threatened species as the significant feature(s) (White 1978; Don Mcfall, IDNR, 1988, pers. comm). Category II areas may or may not also meet Category I criteria.

Statewide Exceptional Natural Area - natural community or assemblage of natural communities that may not meet the critical standards for the INAI, but nevertheless is an exceptional remnant of native vegetation. Reasons for not qualifying for the INAI may include not meeting size requirements, not meeting age-class requirements for forest tracts, or lacking proper vegetation management. Sites described as statewide exceptional in this report that are not restricted by size or age class requirements may qualify for the INAI if appropriate vegetation management is implemented.

Regionally Significant Natural Area - natural community or assemblage of natural communities that is regionally outstanding, but not characterized by a nearly undisturbed condition.

Regionally Exceptional Natural Area - natural community or assemblage of natural communities that supports a noteworthy assemblage of native species within a greatly degraded context (i.e., degraded prairie remnant in a railroad right-of-way).

GENERAL DESCRIPTION OF THE PROJECT AREA

The project area occurs in the Grand Prairie Section, within the Grand Prairie Division (Schwegman 1973). Based on general maps of Anderson (1970), Nuzzo (1986), and Iverson et al. (1989), the area was a mixture of forest and prairie. The three major soil types that occur on site are Ross, Lawson, and Sawmill. All formed under mixed forest and grassland vegetation (National Soils Database 2000). Hononegah occupies a very small portion of the site and is confined to a small ridge near the main entrance. It is a very dry sand droughty soil. Native vegetation was mixed prairie grasses that were tolerant to droughty conditions (National Soils Database 2000). Ross soil is the driest of the three bottomland soils. The original vegetation was scattered deciduous species such as sycamore, elm, ash, and walnut, with prairie grasses. Lawson is a somewhat poorly drained soil. The original vegetation consisted of scattered silver maple, white ash, and American elm, with tall prairie grasses and forbs. Sawmill is the most poorly drained of the four and occurs in the lower areas. Its original vegetation consisted of grasses and trees. (National Soils Database 2000). There is very little evidence of the prairie component today at MWMB. Most of the native vegetation is species commonly found in floodplain forest or mesic-floodplain forest communities. There are very few true prairie species existing at MWMB presently. Most of the area today has been altered from presettlement conditions. Areas that may have been prairie vegetation were probably converted to cropland. The majority of the river terrace has been used for recreational purposes and still has some buildings existing along the riverbank. The forests in the lower areas are dominated by *Acer saccharinum* (silver maple).

A few mesic-floodplain forests exist along the Mazon River. *Acer negundo* (boxelder), *Aesculus glabra* (Ohio buckeye), and *Celtis occidentalis* (hackberry) are the dominant trees in the mesic-floodplain forest community. There is a lack of oaks and hickories in the area. Only a few individuals of *Quercus macrocarpa* (bur oak) and *Carya cordiformis* (bitternut hickory) were found in the area. The oak and *Juglans nigra* (walnut) may have been logged out of the area when

Table 1: cont.

HERBACEOUS LAYER

	RAV
<i>Laportea canadensis</i>	65
<i>Rudbeckia laciniata</i>	40
<i>Claytonia virginica</i>	35 est.
<i>Mertensia virginica</i>	35 est.
<i>Elymus virginicus</i>	33
<i>Cryptotaenia canadensis</i>	29
<i>Ambrosia trifida</i>	22
<i>Sanicula gregaria</i>	22
<i>Hydrophyllum virginianum</i>	20
<i>Aster simplex</i>	19
<i>Alliaria petiolata</i>	18
<i>Osmorhiza longistylis</i>	16
<i>Urtica dioica</i>	16
<i>Galium aparine</i>	15 est.
<i>Ranunculus abortivus</i>	15 est.
<i>Impatiens pallida</i>	13
<i>Carex grayii</i>	12
<i>Asarum canadense</i>	11
<i>Lactuca canadensis</i>	10
<i>Smilacina racemosa</i>	9
<i>Viola sororia</i>	8
<i>Allium tricoccum</i>	5 est.
<i>Elymus canadensis</i>	5
<i>Eupatorium rugosum</i>	5
<i>Phalaris arundinacea</i>	5
<i>Phlox divaricata</i>	5
<i>Smilacina stellata</i>	5
<i>Arisaema dracontium</i>	4
<i>Chaerophyllum procumbens</i>	4
<i>Dioscorea villosa</i>	4
<i>Festuca obtusa</i>	4
<i>Iodanthus pinnatifidus</i>	4
<i>Leersia virginica</i>	4
<i>Menispermum canadense</i>	4
<i>Scrophularia marilandica</i>	4
<i>Verbesina alternifolia</i>	4
<i>Carex blanda</i>	3
<i>Heracleum lanatum</i>	3
<i>Hydrophyllum appendiculatum</i>	3
<i>Polymnia canadensis</i>	3
<i>Amphicarpa bracteata</i>	2
<i>Aster lateriflorus</i>	2
<i>Eupatorium serotinum</i>	2
<i>Geum canadense</i>	2
<i>Lysimachia nummularia</i>	2
<i>Trillium recurvatum</i>	2
<i>Campanula americana</i>	2 est.
<i>Carex spp.</i>	1
<i>Cassia marilandica</i>	1
<i>Eupatorium purpureum</i>	1
<i>Gratiola neglecta</i>	1
<i>Mimulus alatus</i>	1
<i>Panicum clandestinum</i>	1
<i>Phyla lanceolata</i>	1
<i>Polygonum virginianum</i>	1
<i>Polygonum amphibium</i>	1
wood nettle	65
golden glow	40
spring beauty	35 est.
bluebells	35 est.
wild rye	33
honewort	29
giant ragweed	22
common snakeroot	22
virginia waterleaf	20
panicled aster	19
garlic mustard	18
anise-root	16
stinging nettle	16
bed straw	15 est.
butter cup	15 est.
pale touch-me-not	13
sedge	12
wild ginger	11
wild lettuce	10
false solomon seal	9
woolly blue violet	8
wild ramp	5 est.
nodding wild rye	5
white snakeroot	5
reed canary grass	5
blue phlox	5
starry false solomon seal	5
green dragon	4
honewort	4
wild yam	4
nodding fescue	4
purple rocket	4
cut grass	4
moonseed	4
late figwort	4
wing stem	4
sedge	3
cow parsnip	3
great waterleaf	3
leafcup	3
hog peanut	2
side-flowered aster	2
late boneset	2
white avens	2
moneywort	2
red trillium	2
American bellflower	2 est.
sedges	1
Maryland senna	1
joe-pye weed	1
hedge hyssop	1
winged monkey flower	1
broad-leaved panic grass	1
fog-fruit	1
Virginia knotweed	1
water smartweed	1

Table 3. Site 1 Species List

TREE (OVERSTORY)

		RAV
<i>Acer saccharinum</i>	silver maple	5
<i>Acer negundo</i>	boxelder	3
<i>Populus deltoides</i>	cottonwood	3
<i>Celtis occidentalis</i>	hackberry	3
<i>Quercus macrocarpa</i>	bur oak	2
<i>Platanus occidentalis</i>	sycamore	2
<i>Aesculus glabra</i>	Ohio buckeye	2
<i>Ulmus americana</i>	American elm	1
<i>Tilia americana</i>	basswood	1
<i>Fraxinus pennsylvanica</i>	green ash	1
<i>Juglans nigra</i>	walnut	1
<i>Morus alba</i>	white mulberry	1

SHRUB & VINE (UNDERSTORY)

<i>Sambucus canadensis</i>	elderberry	3
<i>Lonicera maackii</i>	bush honeysuckle	2
<i>Staphylea trifolia</i>	bladdernut	2
<i>Rhamnus cathartica</i>	common buckthorn	2
<i>Vitis riparia</i>	river grape	1

HERBACEOUS LAYER

<i>Laportea canadensis</i>	wood nettle	5
<i>Rudbeckia laciniata</i>	golden glow	4
<i>Parthenocissus quinquefolia</i>	Virginia creeper	4
<i>Cryptotaenia canadensis</i>	honewort	4
<i>Alliaria petiolata</i>	garlic mustard	4
<i>Urtica dioica</i>	stinging nettle	3
<i>Sanicula gregaria</i>	common snakeroot	3
<i>Elymus virginicus</i>	wild rye	3
<i>Viola sororia</i>	woolly blue violet	2
<i>Verbesina alternifolia</i>	wing-stem	2
<i>Trillium recurvatum</i>	red trillium	2
<i>Toxicodendron radicans</i>	poison ivy	2
<i>Smilacina racemosa</i>	false solomon seal	2
<i>Mertensia virginica</i>	bluebells	2
<i>Lactuca canadensis</i>	wild lettuce	2
<i>Iodanthus pinnatifidus</i>	purple rocket	2
<i>Impatiens pallida</i>	pale touch-me-not	2
<i>Hydrophyllum virginianum</i>	virginia waterleaf	5
<i>Dioscorea villosa</i>	wild yam	2
<i>Carex grayii</i>	sedge	2
<i>Carex blanda</i>	sedge	2
<i>Aster simplex</i>	panicked aster	2
<i>Asarum canadense</i>	wild ginger	2
<i>Arisaema dracontium</i>	green dragon	2
<i>Festuca obtusa</i>	nodding fescue	2
<i>Aster lateriflorus</i>	side-flowered aster	2

Site 2

Community Type: Mesic-floodplain and Floodplain Forest

Grade: C

Location: T. 33 N., R. 7 E. S/2, SW/4 Section 10 Morris 7.5 Minute Quadrangle

Site 2 occurs north of the Mazon River across the river from Site 1.

Description: Mature Second Growth (50-70 yrs. of age). Site 2 consists of two linear strips of forest. The larger portion is along the southern-most bend in the Mazon River adjacent to bluff

Cephalanthus occidentalis (buttonbush) pond occurs in the center of the forest. Most of the buttonbush is declining from shading.

Table 5. Site 3 Species list

TREE (OVERSTORY)		RAV
<i>Celtis occidentalis</i>	hackberry	5
<i>Acer saccharinum</i>	silver maple	4
<i>Fraxinus pennsylvanica</i>	green ash	2
<i>Juglans nigra</i>	walnut	2
<i>Platanus occidentalis</i>	sycamore	2
<i>Tilia americana</i>	basswood	1
SHRUB & VINE (UNDERSTORY)		
<i>Toxicodendron radicans</i>	poison ivy	3
<i>Staphylea trifolia</i>	bladdernut	3
<i>Cephalanthus occidentalis</i>	buttonbush	2
<i>Smilax hispida</i>	bristly greenbrier	1
HERBACEOUS LAYER		
<i>Laportea canadensis</i>	wood nettle	5
<i>Ambrosia trifida</i>	giant ragweed	4
<i>Rudbeckia laciniata</i>	golden glow	4
<i>Aster simplex</i>	panicked aster	3
<i>Carex grayii</i>	sedge	3
<i>Elymus virginicus</i>	wild rye	3
<i>Leersia virginica</i>	cut grass	3
<i>Sanicula gregaria</i>	common snakeroot	3
<i>Viola sororia</i>	woolly blue violet	3
<i>Cryptotaenia canadensis</i>	honewort	2
<i>Eupatorium serotinum</i>	late boneset	2
<i>Hydrophyllum virginianum</i>	virginia waterleaf	2
<i>Gratiola neglecta</i>	hedge hyssop	1
<i>Mimulus alatus</i>	winged monkey flower	1
<i>Phyla lanceolata</i>	fog-fruit	1

Site 4

Community Type: Mesic-floodplain and Floodplain Forest

Grade: C

Location: T. 33 N., R. 7 E. SW/4, NW/4, NE/4 Section 10 Morris 7.5 Minute Quadrangle

Description: Mature Second Growth (40-60 yrs. of age). Site 4 occurs just east of the Mazon River. It consists of a small strip of mesic-floodplain forest surrounding a highly disturbed floodplain forest. The floodplain forest appears to be flooded regularly during the year. There was standing water several times while I was conducting fieldwork. Because of frequent flooding the herbaceous layer is limited to a few disturbance-tolerant species, including *Laportea canadensis* (wood nettle) and *Ambrosia trifida* (giant ragweed).

Table 6. Site 4 Species list

TREE (OVERSTORY)		RAV
<i>Acer saccharinum</i>	silver maple	5
<i>Morus alba</i>	white mulberry	2
<i>Celtis occidentalis</i>	hackberry	1
SHRUB & VINE (UNDERSTORY)		
<i>Euonymus atropurpureus</i>	whao	1
<i>Toxicodendron radicans</i>	poison ivy	1
<i>Laportea canadensis</i>	wood nettle	5
<i>Ambrosia trifida</i>	giant ragweed	4
<i>Rudbeckia laciniata</i>	golden glow	3

trees and more diversity in all three strata. The second part is a buttonbush pond surrounded by young forest dominated by silver maple 20 to 40 years of age. A few older silver maple trees are scattered around the pond.

Table 8. Site 6 Species list

TREE (OVERSTORY)		RAV
<i>Acer saccharinum</i>	silver maple	5
<i>Acer negundo</i>	boxelder	4
<i>Aesculus glabra</i>	Ohio buckeye	4
<i>Celtis occidentalis</i>	hackberry	4
<i>Salix nigra</i>	black willow	3
<i>Juglans nigra</i>	walnut	2
<i>Morus alba</i>	white mulberry	2
<i>Populus deltoides</i>	cottonwood	2
<i>Ulmus americana</i>	American elm	2
<i>Fraxinus pennsylvanica</i>	green ash	1
<i>Platanus occidentalis</i>	sycamore	1
<i>Quercus macrocarpa</i>	bur oak	1
<i>Tilia americana</i>	basswood	1
SHRUB & VINE (UNDERSTORY)		
<i>Cephalanthus occidentalis</i>	buttonbush	4 local
<i>Vitis riparia</i>	river grape	3
<i>Toxicodendron radicans</i>	poison ivy	3
<i>Euonymus atropurpureus</i>	whao	2
<i>Smilax hispida</i>	bristly greenbrier	2
<i>Lonicera maackii</i>	bush honeysuckle	1
<i>Sambucus canadensis</i>	elderberry	1
<i>Staphylea trifolia</i>	bladdernut	1
HERBACEOUS LAYER		
<i>Cryptotaenia canadensis</i>	honewort	5
<i>Elymus canadensis</i>	nodding wild rye	5
<i>Laportea canadensis</i>	wood nettle	5
<i>Rudbeckia laciniata</i>	golden glow	5
<i>Chaerophyllum procumbens</i>	wild cervil	3
<i>Sanicula gregaria</i>	common snakeroot	3
<i>Urtica dioica</i>	stinging nettle	3
<i>Amphicarpa bracteata</i>	hog peanut	2
<i>Smilacina racemosa</i>	false solomon seal	2
<i>Ambrosia trifida</i>	giant ragweed	1
<i>Aster simplex</i>	panicked aster	1
<i>Hydrophyllum virginianum</i>	virginia waterleaf	1
<i>Heracleum lanatum</i>	cow parsnip	1
<i>Osmorhiza longistylis</i>	anise-root	1

Site 7

Community Type: Mesic-floodplain and Floodplain Forest

Grade: C

Location: T. 33 N., R. 7 E. NW/4, SW/4 Section 11 Morris 7.5 Minute Quadrangle
Northeast of the Mazon River

Description: Mature Second Growth (50-70 yrs. of age). Site 7 has both mesic-floodplain and floodplain forest. The mesic-floodplain forest is concentrated along the southern edge along the Mazon River. The floodplain forest along the eastern side of the river is dominated by silver maple. One large backwater pond exists in this forest. This pond was flooded until late in the year and had very little herbaceous vegetation.

Table 10. Site 8 Species list cont.

<i>Parthenocissus quinguefolia</i>	Virginia creeper	3
<i>Lonicera maackii</i>	bush honeysuckle	2
<i>Viburnum prunifolium</i>	black haw	1
HERBACEOUS LAYER		
<i>Laportea canadensis</i>	wood nettle	4
<i>Osmorhiza longistylis</i>	anise-root	4
<i>Toxicodendron radicans</i>	poison ivy	4
<i>Alliaria petiolata</i>	garlic mustard	3
<i>Asarum canadense</i>	wild ginger	3
<i>Rudbeckia laciniata</i>	golden glow	3
<i>Sanicula gregaria</i>	common snakeroot	3
<i>Lactuca canadensis</i>	wild lettuce	2
<i>Eupatorium rugosum</i>	white snakeroot	2
<i>Chaerophyllum procumbens</i>	honewort	1
<i>Elymus virginicus</i>	wild rye	1
<i>Festuca obtusa</i>	nodding fescue	1
<i>Hydrophyllum appendiculatum</i>	great waterleaf	1
<i>Hydrophyllum virginianum</i>	virginia waterleaf	1
<i>Polymnia canadensis</i>	leafcup	1
<i>Smilacina racemosa</i>	false solomon seal	1
<i>Smilacina stellata</i>	starry false solomon seal	1

Site 9

Community Type: Mesic-floodplain and Floodplain Forest

Grade: C

Location: T. 33 N., R. 7 E. within the S/2 NW/4 and N/2 SW/4 Section 11 Morris 7.5
Minute Quadrangle east of the Mazon River

Description: Mature Second Growth (50-70 yrs. of age) and Young Second Growth (10-30 yrs. of age). Site 9 consists of two different community types. The forest along the southern and eastern edges of the Mazon River is mesic-floodplain forest similar to Site 8 and is relatively diverse. The other community is farther east of the Mazon River. It consists of two backwater ponds surrounded by mature and young silver maple forest and is highly disturbed.

Table 11. Site 9 Species list

TREE (OVERSTORY)		RAV
<i>Acer saccharinum</i>	silver maple	4
<i>Populus deltoides</i>	cottonwood	4
<i>Morus alba</i>	white mulberry	2
<i>Tilia americana</i>	basswood	2
<i>Acer negundo</i>	boxelder	1
<i>Aesculus glabra</i>	Ohio buckeye	1
<i>Fraxinus pennsylvanica</i>	green ash	1
SHRUB & VINE (UNDERSTORY)		
<i>Euonymus atropurpureus</i>	whao	1
<i>Asimina triloba</i>	paw paw	1
<i>Sambucus canadensis</i>	elderberry	1
<i>Smilax hispida</i>	bristly greenbrier	1
<i>Vitis riparia</i>	river grape	1
HERBACEOUS LAYER		
<i>Cryptotaenia canadensis</i>	honewort	4
<i>Elymus virginicus</i>	wild rye	4
<i>Laportea canadensis</i>	wood nettle	4
<i>Aster simplex</i>	panicked aster	3
<i>Parthenocissus quinguefolia</i>	Virginia creeper	2

Table 12. Site 10 Species list cont.

<i>Sanicula gregaria</i>	common snakeroot	2
<i>Smilacina stellata</i>	starry false solomon seal	2
<i>Asarum canadense</i>	wild ginger	1
<i>Aster simplex</i>	panicked aster	1
<i>Carex grayii</i>	sedge	1
<i>Festuca obtusa</i>	nodding fescue	1
<i>Hydrophyllum appendiculatum</i>	great waterleaf	1
<i>Menispermum canadense</i>	moonseed	1
<i>Panicum clandestinum</i>	broad-leaved panic grass	1
<i>Polygonum virginianum</i>	Virginia knotweed	1
<i>Sicyos angulatus</i>	bur cucumber	1
<i>Scirpus atrovirens</i>	bulrush	1
<i>Smilacina racemosa</i>	false solomon seal	1
<i>Viola sororia</i>	woolly blue violet	1

Site 11

Community Type: Mesic-floodplain and Floodplain Forest

Grade: C

Location: T. 33 N., R. 7 E. N/2, NW/4 Section 11 Morris 7.5 Minute Quadrangle

Description: Mature Second Growth (40-60 yrs. of age) and Young Second Growth (10-20 yrs. of age). Site 11 occurs north and east of Mud Slough. There are some older trees next to the stream bank in the mesic-floodplain forest. The forest gets progressively younger near the field edges. Young silver maple dominate the overstory along the drainage ditches cut by flooding from the Mazon River.

Table 13. Site 11 Species list

TREE (OVERSTORY)		RAV
<i>Acer saccharinum</i>	silver maple	5
<i>Aesculus glabra</i>	Ohio buckeye	4
<i>Populus deltoides</i>	cottonwood	2
<i>Ulmus americana</i>	American elm	2
<i>Acer negundo</i>	boxelder	1
<i>Celtis occidentalis</i>	hackberry	1
<i>Fraxinus pennsylvanica</i>	green ash	1
<i>Morus alba</i>	white mulberry	1
<i>Quercus macrocarpa</i>	bur oak	1
SHRUB & VINE (UNDERSTORY)		
<i>Parthenocissus quinquefolia</i>	Virginia creeper	1
<i>Euonymus atropurpureus</i>	whao	1
<i>Ribes missouriense</i>	gooseberry	1
<i>Sambucus canadensis</i>	elderberry	1
<i>Smilax hispida</i>	bristly greenbrier	1
HERBACEOUS LAYER		
<i>Laportea canadensis</i>	wood nettle	5
<i>Elymus virginicus</i>	wild rye	3
<i>Impatiens pallida</i>	pale touch-me-not	3
<i>Rudbeckia laciniata</i>	golden glow	3
<i>Alliaria petiolata</i>	garlic mustard	2
<i>Osmorhiza longistylis</i>	anise-root	2
<i>Asarum canadense</i>	wild ginger	1
<i>Carex grayii</i>	sedge	1
<i>Cryptotaenia canadensis</i>	honestwort	1
<i>Hydrophyllum appendiculatum</i>	great waterleaf	1
<i>Leersia virginica</i>	cut grass	1

Table 15. Site 13 Species list

TREE (OVERSTORY)		RAV
<i>Acer negundo</i>	boxelder	5
<i>Juglans nigra</i>	walnut	3
<i>Ulmus americana</i>	American elm	2
<i>Acer saccharinum</i>	silver maple	1
<i>Aesculus glabra</i>	Ohio buckeye	1
<i>Celtis occidentalis</i>	hackberry	1
<i>Populus deltoides</i>	cottonwood	1
SHRUB & VINE (UNDERSTORY)		
<i>Vitis riparia</i>	river grape	1
HERBACEOUS LAYER		
<i>Laportea canadensis</i>	wood nettle	3
<i>Alliaria petiolata</i>	garlic mustard	3
<i>Cryptotaenia canadensis</i>	honewort	2
<i>Elymus virginicus</i>	wild rye	2
<i>Carex grayii</i>	sedge	1
<i>Impatiens pallida</i>	pale touch-me-not	1
<i>Lactuca canadensis</i>	wild lettuce	1
<i>Osmorhiza longistylis</i>	anise-root	1
<i>Viola sororia</i>	woolly blue violet	1
<i>Ambrosia trifida</i>	giant ragweed	1
<i>Aster simplex</i>	panicked aster	1
<i>Hydrophyllum virginianum</i>	virginia waterleaf	1
<i>Polymnia canadense</i>	leafcup	1

Site 14

Community Type: Shrubland

Grade: D

Location: T. 33 N., R. 7 E. W/2, NE/4 Section 11 Morris 7.5 Minute Quadrangle

Description: Very Young Second Growth (5-20 yrs. of age). Site 14 is a group of farmed wetlands that have been colonized by silver maple, *Salix exigua* (sandbar willow), and *Populus deltoides* (cottonwood). They all are very disturbed with low diversity. The forest closest to Site 13 is a pond with an older stand of silver maple.

Table 16. Site 14 Species list

TREE (OVERSTORY)		RAV
<i>Acer saccharinum</i>	silver maple	5
<i>Salix exigua</i>	sandbar willow	5
<i>Populus deltoides</i>	cottonwood	3
SHRUB & VINE (UNDERSTORY)		
<i>Toxicodendron radicans</i>	poison ivy	2
<i>Vitis riparia</i>	river grape	2
<i>Smilax hispida</i>	greenbrier	1
<i>Aster simplex</i>	panicked aster	3
<i>Elymus virginicus</i>	wild rye	3
<i>Rudbeckia laciniata</i>	golden glow	3
HERBACEOUS LAYER		
<i>Ambrosia trifida</i>	giant ragweed	1
<i>Lysimachia nummularia</i>	moneywort	1
<i>Polygonum amphibium</i>	water smartweed	1

have added several species to the possible planting list for the following reasons: 1). they already occur at the site and are adapted to the environmental conditions that exist at MWMB, 2). they may not occur on the site but are known from forest communities in the general geographic area, 3). they provide valuable wildlife food and cover. To increase the production of mast and fruit for wildlife certain tree and shrub species will need to be planted. Because there are relatively low numbers of adult individuals of certain species, especially oaks, these should be given high priority during planting. The few individuals that occur on site will not be producing enough seedlings to compete in the fallow fields. It is likely the silver maple, cottonwood, and willow will quickly colonize the fallow fields because: 1) they are early successional species that are fast growing, and quickly grow in areas of reduced competition and 2) these species dominated most forest tracts at the MWMB and are producing a large amount of viable seed. It will be easier to control weeds and weedy tree species if trees are planted in rows. The marked rows should be planted either along the geographic contours or along moisture gradients depending on each species' ecological optimum. This exact planting rate and location can be developed in greater detail when better mapping is made available. It is not feasible to plant species in the herbaceous layer. As the overstory matures the herbaceous species hopefully will colonize the areas from the remaining forest tracts. Garlic mustard is common in certain areas and will be a problem in the future. Controlling this species after the trees have been planted will be difficult because fire is considered to be the most cost effective method of controlling garlic mustard (Nuzzo 1991). Unfortunately fire will be detrimental to several species of trees in the planting list. Table 18 and 19 are lists of suggested wood species that could be planted at the MWMB. Table 20 is herbaceous species that occur the MWMB and are desirable for transplantation back into the restoration sites after the canopy develops.

Table 18. Woody Planting List for Mesic-floodplain Forest on Ross and Lawson Soils

TREES (OVERSTORY)		Comments
<i>Aesculus glabra</i>	Ohio buckeye	common on site
<i>Carya cordiformis</i>	bitternut	uncommon on site
<i>Carya ovata</i>	shagbark hickory	plant in driest areas
<i>Gymnocladus dioica</i>	Kentucky coffeetree	a few stands on site
<i>Juglans nigra</i>	walnut	scattered throughout site
<i>Quercus macrocarpa</i>	bur oak	few on site
<i>Quercus rubra</i>	red oak	found in similar forest just east of site
<i>Tilia americana</i>	basswood	found on site
SHRUBS (UNDERSTORY)		
<i>Asimina triloba</i>	paw paw	rare on site
<i>Euonymus atropurpureus</i>	whao	common understory in mesic-floodplain forests
<i>Ptelea trifoliata</i>	wafer ash	rare on site
<i>Staphylea trifolia</i>	bladdernut	common understory shrub in mesic-floodplain forest
<i>Viburnum acerifolium</i>	maple leaved arrowood	not found on site/ plant in driest areas/ valuable shrub that takes shading/ forms colonies that hold fruit until late fall for wildlife
<i>Viburnum lentago</i>	nannyberry	not found on site/valuable shrub holds fruit until late fall for wildlife

Table 19. Woody Planting List for Floodplain forest on Sawmill Soil

TREES (OVERSTORY)		Comments
<i>Fraxinus pennsylvanica</i>	green ash	common on site
<i>Platanus occidentalis</i>	sycamore	rare on site/ mature tree often hollow and important for den sites for mammals & cavity nesting birds
<i>Quercus bicolor</i>	swamp white oak	not on site/ plant on wet sites
<i>Quercus palustris</i>	pin oak	not on site/plant on wet sites

resource. They may not be as floristically diverse as grade A or B remnants, but they serve important functions in Illinois landscape:

1. With the decrease in prairie habitat and the increased need for habitat reconstruction and restoration, grade C remnants provide an invaluable source of seed of local ecotypes.
2. They offer refugia for species that have been eliminated from the nearby landscape and they sometimes link areas of higher quality prairies, allowing for dispersal of species and genetic information from one remnant to another.
3. They may cross several soil types and moisture gradients, creating a community of high floristic and faunistic diversity throughout a given landscape.
4. They provide cover and dispersal corridors for prairie flora and fauna.

Prairie restoration at the MWMB should be considered a feasible option for some of the areas that recently have been taken out of cultivation. According to the National Soils Database (2000) Hononegah, Lawson, Ross, and Sawmill soils are all capable of supporting native prairie. There are several areas within a 10 mile radius that could be used for local seed sources in the reconstruction. In 1996 IDOT requested that a botanical survey for FAP 326 (IL Rt. 47) be conducted by the Illinois Natural History Survey's Statewide Biological Assessment Program and Wetland and Preliminary Studies Group. The study extended from the Illinois River Bridge to Rt. 113 on both sides of Route IL 47. Wet-mesic prairie and shrubland communities were described as Site 3 Hill (1997) and Site 8 Tessene et al. (1996) during the study. This site is next to Hildy Prairie natural area (INAI no. 1360), a category I and II wet-mesic prairie, located 0.7 km (0.4 mi.) west of the Route 47 corridor at T33N., RE., NE/4 section 21 (Hill 1997). This site contains species suitable for planting at the MWMB. Since this site is very close to the MWMB and may be impacted by future construction, it seems like a logical option to use the area for potential mitigation. Site 3 occurs on the upper river terrace in a small depressional wetland. *Tomanthera auriculata* (ear-leaved foxglove), a state threatened species occurs at this site (Hill 1997). *Napea dioica* (glade mallow) a rare species in Illinois also occurs near the MWMB in several sites across IL 47. The state threatened *Filipendula rubra* (queen-of-the-prairie) and the federally threatened and Illinois endangered orchid *Platanthera leucophaea* (prairie white fringed orchid) occur at nearby Hildy Prairies (Hill 1997). It may be an option to introduce these species to the MWMB site; since a seed source is extremely close and if viable populations could be established at the MWMB, it would provide some degree of protection. If these species need to be reintroduced in the event of an ecological mishap on private land, then the MWMB could be used as source of local ecotype seed for reintroduction. Goose Lake, Hildy, and Third Avenue Prairies are in the vicinity and are also potential seed sources for prairie restoration in the MWMB. Since several soil types and moisture gradients occur at MWMB it allows for greater species diversity and restoration options. Aerial Photograph 1 shows the area, in my opinion, that would be suited for prairie restoration. When more hydrological data are available a more detailed planting plan can be developed for the area. The species lists have been developed from inventory lists from the Route 47 IDOT site, Goose Lake, Short Pioneer Cemetery, Hildy, and Third Avenue prairies. Short Pioneer Cemetery Prairie is a dry sand prairie with sparta soils. Hononegah is a similar soil to sparta but has more gravel in the underlying layers. Native vegetation was mixed prairie grasses that were tolerant to droughty conditions (National Soils Database 2000). Some of the species such as *Opuntia humifusa* (prickly pear cactus) and *Callirhoe triangulata* (poppy mallow) at Short Pioneer Cemetery Prairie are typical of drier sand prairies and probably did not exist historically in the general vicinity of MWMB; therefore, I excluded certain species from Short Pioneer Cemetery Prairie from the list. Planting rate is indicated by an asterisk, one being the least aggressive and five the most aggressive species. Species with four or five asterisks should be planted very sparingly. More detailed seeding rates can be applied when a detailed restoration plan is designed. Table 21 is a list of species suitable for planting at the MWMB. Table 22 and 23 are prairie species separated by moisture requirements.

Table 21. Master List for Prairie Reconstruction at the MWMB. cont.

Scientific name	Common name	type	Wetland Indicator Status	Planting Rate
<i>Aster ericoides</i>	heath aster	forb	FACU-	***
<i>Aster novae-angliae</i>	New England aster	forb	FACW	*****
<i>Aster oolentangiensis</i>	Sky-blue aster	forb	UPL	**
<i>Aster puniceus</i>	swamp aster	forb	OBL	**
<i>Aster simplex</i>	panicled aster	forb	FACW	**
<i>Baptisia lactea</i>	wild indigo	forb	FACU	****
<i>Baptisia leucophaea</i>	cream wild indigo	forb	UPL	*
<i>Bidens aristosa</i>	swamp marigold	forb	FACW	****
<i>Bidens frondosa</i>	beggar's ticks	forb	FACW	***
<i>Cacalia plantaginea</i>	prairie Indian plantain	forb	FAC	*
<i>Caltha palustris</i>	marsh marigold	forb	OBL	*
<i>Cassia fasciculata</i>	partridge pea	forb	FACU-	***
<i>Ceanothus americanus</i>	New Jersey tea	forb	UPL	*
<i>Cicuta maculata</i>	water hemlock	forb	OBL	***
<i>Commandra umbellata</i>	bastard toadflax	forb	FACU	*
<i>Coreopsis palmata</i>	tickseed	forb	UPL	**
<i>Coreopsis tripteris</i>	tickseed	forb	FAC	***
<i>Dalea candida</i>	white prairie clover	forb	UPL	*
<i>Dalea purpurea</i>	purple prairie clover	forb	UPL	*
<i>Desmodium canadense</i>	showy tick trefoil	forb	FAC-	*****
<i>Desmodium illinoense</i>	Illinois tick trefoil	forb	UPL	***
<i>Dodecatheon meadia</i>	shooting star	forb	FACU	*
<i>Erygium yuccifolium</i>	rattlesnake master	forb	FAC+	****
<i>Eupatorium maculatum</i>	spotted Joe-Pye weed	forb	OBL	***
<i>Eupatorium perfoliatum</i>	boneset	forb	FACW+	***
<i>Euphorbia corollata</i>	flowering spurge	forb	UPL	*****
<i>Euthamia graminifolia</i>	grass-leaved goldenrod	forb	FACW-	*****
<i>Filipendula rubra</i>	queen of the prairie	forb	FACW+	*
<i>Fragaria virginiana</i>	wild strawberry	forb	FAC-	*
<i>Gentiana andrewsii</i>	bottle gentian	forb	FACW	*
<i>Gentiana puberulenta</i>	downy gentian	forb	FACU	*
<i>Geum laciniatum</i>	marsh avens	forb	FACW	***
<i>Helenium autumnale</i>	sneezeweed	forb	FACW+	***
<i>Helianthus grosseserratus</i>	sawtooth sunflower	forb	FACW-	*****
<i>Helianthus occidentalis</i>	western sunflower	forb	UPL	***
<i>Helianthus tuberosus</i>	Jerusalem artichoke	forb	FAC	*****
<i>Heltanthus mollis</i>	downy sunflower	forb	UPL	**
<i>Heuchera richardsonii</i>	prairie alum root	forb	UPL	*
<i>Hypericum sphaerocarpum</i>	prairie St. John'swort	forb	FACU	**
<i>Hypoxis hirsuta</i>	yellow star grass	forb	FAC	*
<i>Iris shrevei</i>	blue flag iris	forb	OBL	**
<i>Krigia biflora</i>	false dandelion	forb	FACU	*
<i>Lespedeza capitata</i>	round-headed bush clover	forb	UPL	*****
<i>Liatris aspera</i>	rough blazing star	forb	UPL	**
<i>Liatris pycnostachya</i>	prairie blazing-star	forb	FAC-	*
<i>Lithospermum canescens</i>	hoary puccoon	forb	UPL	*
<i>Lithospermum carolinense</i>	sand puccoon	forb	UPL	*
<i>Lithospermum incisum</i>	yellow puccoon	forb	UPL	**
<i>Lobelia cardinalis</i>	cardinal-flower	forb	OBL	**
<i>Lobelia siphilitica</i>	blue lobelia	forb	FACW+	***
<i>Lobelia spicata</i>	pale spike lobelia	forb	FAC	*
<i>Ludwigia alternifolia</i>	seedbox	forb	OBL	**
<i>Ludwigia palustris</i>	marsh purslane	forb	OBL	*
<i>Ludwigia polycarpa</i>	false loosestrife	forb	OBL	*

Table 22. Potential planting list for slope with Hononegah soil. Dry to dry-mesic prairie list

Scientific name	Common name	Type	Planting rate
<i>Eragrostis spectabilis</i>	tumble grass	grass	****
<i>Panicum villosissimum</i>	hairy panic grass	grass	**
<i>Schizachyrium scoparium</i>	little bluestem	grass	***
<i>Sorghastrum nutans</i>	Indian grass	grass	*****
<i>Sphenopholis nitida</i>	wedge grass	grass	*
<i>Sporobolus heterolepis</i>	northern dropseed	grass	*
<i>Stipa spartea</i>	needle grass	grass	**
<i>Cyperus filiculmis</i>	nut sedge	nut sedge	**
<i>Carex bicknellii</i>	sedge	sedge	*
<i>Carex meadii</i>	sedge	sedge	*
<i>Amorpha canescens</i>	lead plant	forb	*
<i>Asclepias amplexicaulis</i>	sand milkweed	forb	*
<i>Asclepias hirtella</i>	tall green milkweed	forb	*
<i>Asclepias sullivantii</i>	prairie milkweed	forb	*
<i>Asclepias syriaca</i>	common milkweed	forb	****
<i>Asclepias tuberosa</i>	butterfly milkweed	forb	**
<i>Asclepias verticillata</i>	whorled milkweed	forb	****
<i>Aster ericoides</i>	heath aster	forb	***
<i>Aster oolentangiensis</i>	Sky-blue aster	forb	**
<i>Baptisia lactea</i>	wild indigo	forb	****
<i>Baptisia leucophaea</i>	cream wild indigo	forb	*
<i>Cassia fasciculata</i>	partridge pea	forb	**
<i>Ceanothus americanus</i>	New Jersey tea	forb	*
<i>Commandra umbellata</i>	bastard toadflax	forb	*
<i>Coreopsis palmata</i>	tickseed	forb	**
<i>Dalea candida</i>	white prairie clover	forb	*
<i>Dalea purpurea</i>	purple prairie clover	forb	*
<i>Desmodium illinoense</i>	Illinois tick trefoil	forb	***
<i>Dodecatheon meadia</i>	shooting star	forb	*
<i>Euphoria corollata</i>	flowering spurge	forb	*****
<i>Gentiana puberulenta</i>	downy gentian	forb	*
<i>Helianthus occidentalis</i>	western sunflower	forb	***
<i>Heltanthus mollis</i>	downy sunflower	forb	**
<i>Heuchera richardsonii</i>	prairie alum root	forb	*
<i>Hypericum sphaerocarpum</i>	prairie St. John'swort	forb	**
<i>Krigia biflora</i>	false dandelion	forb	*
<i>Lespedeza capitata</i>	round-headed bush clover	forb	****
<i>Liatris aspera</i>	rough blazing star	forb	**
<i>Lithospermum canescens</i>	hoary puccoon	forb	*
<i>Lithospermum carolinense</i>	sand puccoon	forb	*
<i>Lithospermum incisum</i>	yellow puccoon	forb	**
<i>Monarda fistulosa</i>	wild bergamot	forb	*****
<i>Oenothera biennis</i>	evening primrose	forb	****
<i>Parthenium integrifolium</i>	American feverfew	forb	*
<i>Pedicularis canadensis</i>	lousewort	forb	**
<i>Polygala sanguinea</i>	field milkwort	forb	*
<i>Polytaenia nuttallii</i>	prairie parsley	forb	*
<i>Potentilla arguta</i>	prairie cinquefoil	forb	**
<i>Potentilla simplex</i>	common cinquefoil	forb	***
<i>Prenanthes aspera</i>	rough white lettuce	forb	****
<i>Ratibida pinnata</i>	yellow cornflower	forb	*****
<i>Rudbeckia hirta</i>	black-eyed Susan	forb	***
<i>Ruellia humilis</i>	wild petunia	forb	*
<i>Schizachyrium scoparium</i>	little bluestem	forb	**
<i>Scutellaria leonardii</i>	small skullcap	forb	*
<i>Silphium integrifolium</i>	rosinweed	forb	****

Table 23. Potential species list for with Lawson and Sawmill soils Mesic to wet prairie cont.

Scientific name	Common name	Type	Planting rate
<i>Eupatorium maculatum</i>	spotted Joe-Pye weed	forb	***
<i>Eupatorium perfoliatum</i>	boneset	forb	***
<i>Euthamia graminifolia</i>	grass-leaved goldenrod	forb	*****
<i>Filipendula rubra</i>	queen of the prairie	forb	*
<i>Fragaria virginiana</i>	wild strawberry	forb	*
<i>Gentiana andrewsii</i>	bottle gentian	forb	*
<i>Geum laciniatum</i>	marsh avens	forb	***
<i>Helenium autumnale</i>	sneezeweed	forb	***
<i>Helianthus grosseserratus</i>	sawtooth sunflower	forb	*****
<i>Helianthus tuberosus</i>	Jerusalem artichoke	forb	*****
<i>Hypoxis hirsuta</i>	yellow star grass	forb	*
<i>Iris strepera</i>	blue flag iris	forb	***
<i>Liatris pycnostachya</i>	prairie blazing-star	forb	*
<i>Lobelia cardinalis</i>	cardinal-flower	forb	**
<i>Lobelia siphilitica</i>	blue lobelia	forb	***
<i>Lobelia spicata</i>	pale spike lobelia	forb	*
<i>Ludwigia alternifolia</i>	seedbox	forb	**
<i>Ludwigia palustris</i>	marsh purslane	forb	*
<i>Ludwigia polycarpa</i>	false loosestrife	forb	*
<i>Lycopus americanus</i>	bugleweed	forb	***
<i>Lysimachia quadriflora</i>	narrow leaved loosestrife	forb	*
<i>Lythrum alatum</i>	winged loosestrife	forb	*
<i>Mentha arvensis</i>	field mint	forb	**
<i>Mimulus ringens</i>	monkey flower	forb	*
<i>Napaea dioica</i>	glade mallow	forb	****
<i>Oenothera pilosella</i>	prairie sundrops	forb	*
<i>Oxypolis rigidior</i>	cowbane	forb	*
<i>Pedicularis lanceolata</i>	swamp lousewort	forb	*
<i>Penstemon digitalis</i>	foxglove beardtongue	forb	***
<i>Penthorum sedoides</i>	ditch stonecrop	forb	**
<i>Phlox glaberrima</i>	marsh phlox	forb	*
<i>Phlox pilosa</i>	prairie phlox	forb	*
<i>Physostegia virginiana</i>	obedient plant	forb	*
<i>Platanthera leucophaea</i>	prairie white fringed orchid	forb	*
<i>Proserpinaca palustris</i>	mermaid weed	forb	*
<i>Pycnanthemum virginianum</i>	mountain mint	forb	***
<i>Rudbeckia subtomentosa</i>	black-eyed susan	forb	*
<i>Silphium perfoliatum</i>	cup plant	forb	*****
<i>Silphium terebinthinaceum</i>	prairie dock	forb	*****
<i>Sium suave</i>	water parsnip	forb	*
<i>Solidago gigantea</i>	late goldenrod	forb	*****
<i>Stachys palustris</i>	woundwort	forb	**
<i>Stachys tenuifolia</i>	hedge nettle	forb	**
<i>Thalictrum dasycarpum</i>	tall meadow-rue	forb	*
<i>Tomanthera auriculata</i>	ear-leaved false foxglove	forb	*
<i>Verbena hastata</i>	blue vervain	forb	*
<i>Vernonia fasciculata</i>	prairie ironweed	forb	***
<i>Vernonia missurica</i>	Missouri ironweed	forb	**
<i>Veronicastrum virginicum</i>	culver's root	forb	**
<i>Zizia aurea</i>	golden asters	forb	*